FOOD ENGINEERING

March 1952

A McGRAW-HILL PUBLICATION • FORMERLY FOOD INDUSTRIES

35 CENTS

PACKAGING EFFICIENCY is vitally affected by performance of materials on production line. (See Report, page 67)

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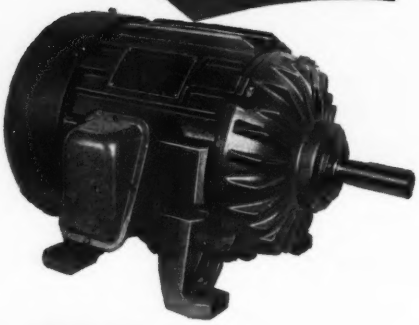
ALLIS-CHALMERS

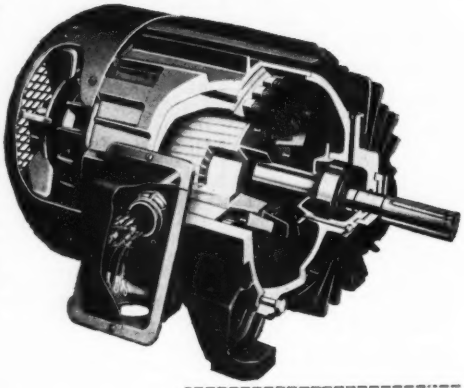
Totally-Enclosed Fan-Cooled MOTORS

Look Outside



Greatly increased radiating area means greater cooling efficiency. More important, cooling efficiency stays high, regardless of operating conditions. There are no enclosed external air passages to clog and cause overheating. If oily dirt sticks, just wipe or blow it off. No matter how bad operating conditions are, this motor can be easily kept clean and cool running. Electrical parts are protected against corrosive atmospheres by cast iron yokes and end housings.

Look Inside



Double-shielded, heavy-duty ball bearings require no maintenance in ordinary service under most conditions. However, they can be lubricated without disassembly if required. Double shielding prevents over-lubrication, leading cause of bearing trouble. Rotating seals, where shaft extends through housings, keep dirt and moisture out of bearing chambers. Die cast rotor and interphase insulation are further assurance of long life and low maintenance.

See WHY THIS IS YOUR BEST MOTOR BUY

HERE IS A MOTOR that is different from conventional TEFC motors; built with an entirely different cooling system that gives you big savings in lower maintenance, more continuous service and less trouble in the toughest locations. Clogging can easily be prevented in the Allis-Chalmers Type APZ TEFC motor since areas that might collect dirt are exposed and easy to clean.

GET DETAILS NOW — *Ask your nearby Allis-Chalmers Authorized Distributor or District Office for more complete information on this high performance TEFC motor. Or write direct to Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 51B7225.* A-3578

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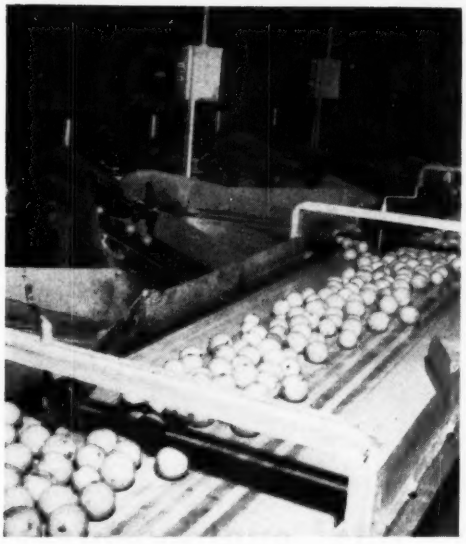
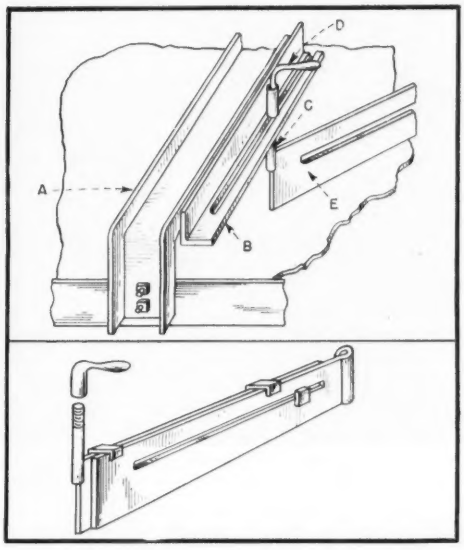
PRACTICAL IDEAS





Easy-to-Make Conveyor Discharge

Using only strap iron, threaded posts, and screw handles, efficient diverters (see photo) can easily be made that will discharge any portion of product at chosen points along a belt conveyor.

This is how to go about making the devices: Channel iron (A in top sketch) is bent to form U supports, suspended over the conveyor. These are bolted or welded to the conveyor guides at the near side of the discharge openings, in the direction of conveyor travel.

Welded to the side face of the channel and above the conveyor is a section of angle iron (B), slotted along the horizontal surface to permit cross-conveyor travel of a vertical post (C).

That portion of the post projecting above the slotted angle iron is threaded for a screw handle (D). To the section below the slot, the diverter (E) is welded.

The diversion gate (lower sketch) is fabricated from two pieces of strap iron, one of which is slotted. The other carries a guide member that fits within the slot. Folded over the slotted member are flaps that hold the two members closely together. Since one member is hinged to the guide rail of the conveyor, the diverter is elongated or contracted as the threaded part is moved in its slot across the conveyor.

Diverter can be adjusted to any position by loosening the handle, shifting the post in this slot, and tightening.—*W. W. Thomas & L. H. Keller, Mechanical Department, Real Gold Citrus Products Co., Anaheim, Calif.*

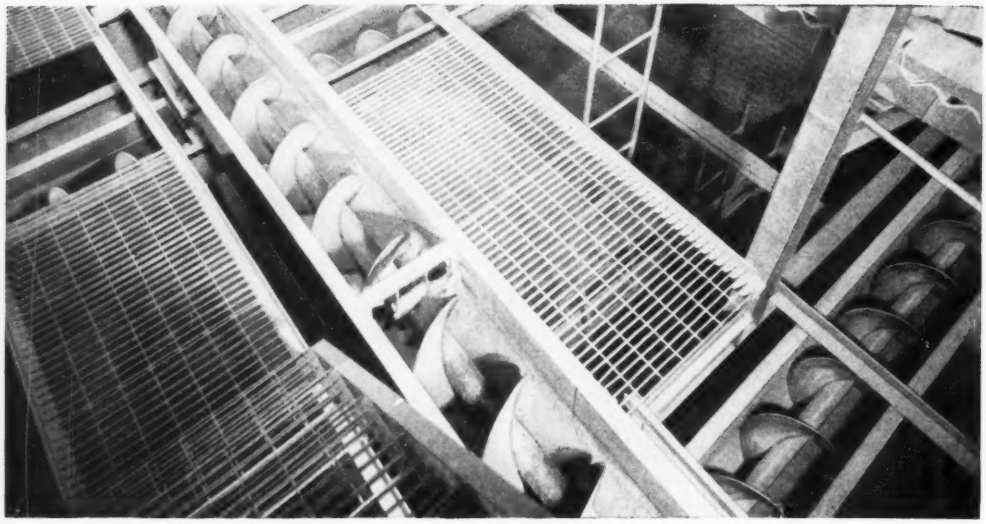
Clipping Rack Aids Training

Made of a few feet of plywood and sheet aluminum, and plant-fabricated at a cost of but $30, a magazine-article holder, erected near our plant lunch room, has proved a helpful asset in employee training.

The ½-in. plywood sheet of the rack, to which the clipping pockets are attached, is 1½ ft. wide and 5 ft. high. It is illuminated at the top by a 14 in. fluorescent bulb. Metal sheets that hold the clippings are screwed to the base and extend up and out at a narrow angle.

Clippings are selected from trade and industrial publications to keep employees informed on new ideas developed in the food industry, especially functional information on such broad subjects as safety, sanitation, maintenance, sales, and distribution.

All told, this reading facility has proved widely beneficial. Appreciated by the workers, it has promoted both the spread of practical information and discussion of the pertinent topics, thus acting in the nature of a training course.—*M. E. Robb, Superintendent of Production, Taystee Baking Co., Decatur, Ill.*



This Link-Belt 12-inch screw conveyor delivers screened mixed material to four 12-inch diameter reversible screw conveyors. These distribute to 16 raw-material storage bins through a series of discharge gates and chutes.

There's no substitute for "total engineering" in screw conveyors

LINK-BELT integrates all components to give you the right screw conveyor for your job

HERE'S how "total engineering" works for you when you buy Link-Belt Screw Conveyors.

First, conveying specialists analyze your problem. Then, Link-Belt's vast experience in design and manufacture is at your command to recommend the screw conveyor—or system of conveyors—for your particular requirements. The right components are then selected from Link-Belt's complete range of types and sizes.

Link-Belt "total engineering" on your screw conveyors is your assurance of efficient design . . . balanced performance.

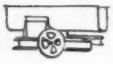
To benefit from Link-Belt's materials handling experience and engineering service, contact the Link-Belt office near you.

LINK-BELT designs and builds all components

SCREWS—Link-Belt makes a complete range of conveyor screws—Helicoid, Sectional Flight, Cut Flight, Ribbon Flight, Paddle type and other special types for such diverse applications as feeding, conveying, mixing, agitating, stirring, blending, etc.

HANGERS—Available in a variety of styles and mountings, with various bearing materials and steel or cast hanger frames.

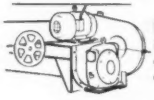
TROUGHS—Link-Belt builds flanged, angle flanged, flared, rectangular, dust-seal, jacketed and drop-bottom types in steel or alloy metals. Variety of connections, supports, covers and clamps offers added design flexibility.



SPOUTS & GATES—Plain discharge spouts can be fixed or detachable. Discharge gates, flat or curved slide, can be hand or rack-and-pinion operated.

SHAFTS & COUPLINGS — Conveyor couplings and end shafts are designed for adequate torsional strength and have jig-drilled coupling bolt holes for accurate alignment.

TROUGH ENDS—Steel or alloy metal plate or cast trough ends to match all trough shapes, provide required shaft bearing support and alignment. Seal glands to protect bearings, if required.



DRIVES — Link-Belt designs and builds many forms of drives to suit specific conditions—Enclosed gear, Electrofluid, P.I.V. variable speed, and chain drives of various types.

LINK-BELT

SCREW CONVEYORS

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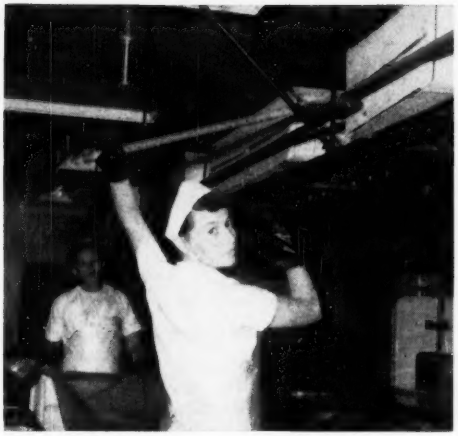


"T"-Pipe Controls Box Flow

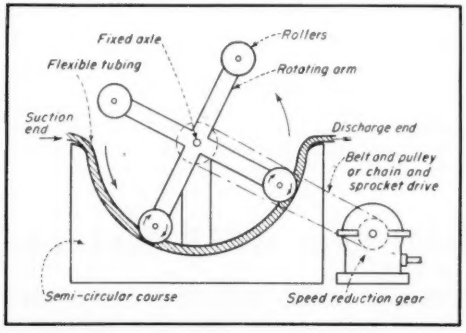
Three lengths of pipe threaded into a "T" make an easily operated manual stop for cases moving on an overhead conveyor.

In our poultry eviscerating plant at Salisbury, Md., empty wood cases reach the packing room on such a conveyor. And since several stations are served, control of the flow of boxes is necessary so that an ample number is on hand at each station.

However, when the conveyor is filled from end to end, boxes "wedge" and are hard to remove, hence occasional halting of the flow makes handling easier.

The stop which neatly does the trick is made in this manner: A ¾ in. pipe about 1½ ft. in length is welded to the side-rail conveyor guide, slightly elevated in the direction of conveyor travel. Then, on the elevated end of this anchored pipe, a "T" joint is loose-threaded. Cross-bar of the "T" is extended by screwing 2-ft. lengths of pipe into each end.

When this cross-bar is vertical, boxes move along conveyor. But when it's swung to horizontal (as operator illustrates in photo), boxes are halted.—*Stokes Homan, Poultry Technologist, Armour and Company, Salisbury, Md.*



Accurate Home-Made Metering Pump

Applying the peristaltic-action principle, a simple pump can be built to proportion any liquids accurately.

Such a pump, in addition to being simple to make, has the further advantage that the fluid moved is confined within the flexible tubing, hence never contacts anything but this tubing during pumping. Thus, this pumping device can be made resistant to corrosive liquids by the proper selection of available flexible plastics or rubber tubing.

Referring to sketch, here is the easy and inexpensive way to build the pump:

First, make a semi-circular course—cut it in wood, or form it of sheet iron—to serve as a track in which to lay a length of plastic or rubber flexible tubing. Width of the course should be four times as wide as the diameter of the largest tubing to be used.

Now, a fixed axle with "Ferris wheel"-like spokes, to which flat surfaced rollers are attached, is mounted over the semi-circular tube-course. Heavy copper tubing with steel inserts will prove satisfactory for the construction of the rollers. They should be three times the diameter of the flexible tubing.

The Ferris wheel may be rotated by belt or chain drive from a speed-reducer control to a sheave mounted on the wheel. As the latter rotates, rollers on ends of the arms follow the curve of the semi-circular course, squeezing against the flexible tubing and thus moving forward slugs of the product.

Distance between rollers and course will have to be varied for different sizes and thicknesses of flexible tubing, hence provision should be made on the wheel support to raise or lower the assembly.

Using this type pump, a vacuum up to 25 in. of mercury can be produced at the suction end of the tube, while two or three atmospheres are developed at the pressure end.

Since it functions as a positive displacement pump, the unit can be used for metering. For variations in amount of fluid delivered will be determined by the inside diameter of the tubing and the speed of rotation of the wheel.

If desirable, the original construction can be such that the flexible tube may be disconnected and divested of fittings for sanitary cleaning.—*Alloys L. Lappel, University of California, Davis, Calif.*

$50 EXTRA FOR BEST ITEM

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.

Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

JANUARY PRACTICAL IDEA voted best was "Paint on Windows Keeps Plant Cool," submitted by John Nano, of G. F. Heublein & Bro., Hartford, Conn. Described were benefits obtained when blue paint was applied to winery windows. Glare was cut, working light inside softened, and summer temperatures lowered 5 deg.

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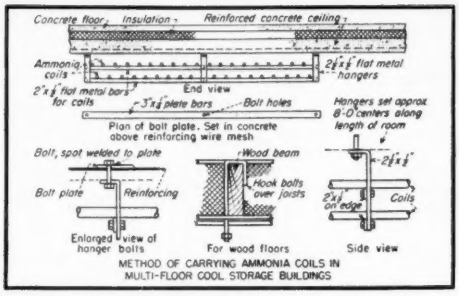


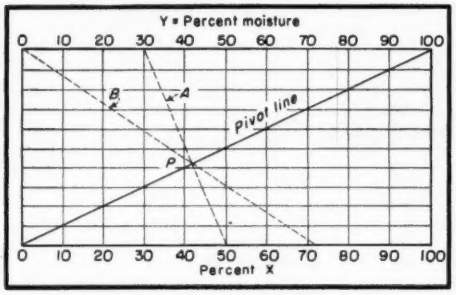
METHOD OF CARRYING AMMONIA COILS IN MULTI-FLOOR COOL STORAGE BUILDINGS

Novel Ceiling Support for Coils

From metal scrap or from material normally carried in repair-shop stock, a sturdy, economical overhead support can be made for refrigeration coils.

It is only necessary that the bolt plates be set, according to a predetermined plan, in the form-work of the floors, before pouring—with bolt plates protruding down from the ceiling.

When this is done, assembly of the coil can proceed according to the details given in the accompanying drawing.—*F. C. Bevan, Melbourne, Australia.*



Simplifies Wet-Dry Calculations

Here's a handy nomograph that will enable you to make rapid and accurate determinations of the percentage composition of components of a wet mixture on a dry weight basis.

By this short-cut method, you can side-step considerable routine work usually given to laboratory tests and analyses. How to go about your determinations is indicated by the following example (see dotted lines on graph):

Problem: A sample of material contains 50 percent starch and 30 percent moisture by weight (hence, contains 20 percent by weight of other components). What is the percentage of starch by weight on a dry basis?

Solution: Connect 30 (moisture) on the Y scale with 50 (starch) on the X scale by means of a straight line (A). Mark the point (P) where this line crosses the pivot line. A straight line (B) through this point (P) on the pivot line and zero (O) on the Y scale intersects the X axis at 71.5. Hence the percent starch by weight on a dry basis is 71.5.

To clarify the method, let's assume we have a mixture of several components containing X percent of a known component and Y percent moisture by weight. The mixture will contain Z percent by weight of all other components, so that X plus Y plus Z equals 100. The percentages X and Z are known as percentages on a wet basis. It is desired, however, to express these component percentages on a dry basis.

The percentage composition of the known component on a dry basis (X') is given by the equation—

$$X' = \frac{100X}{100-Y}$$

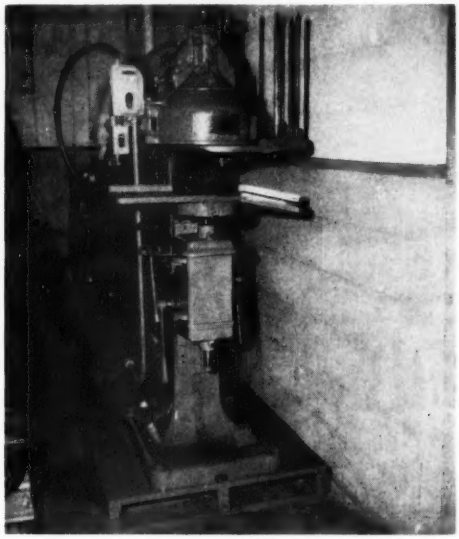
By rearranging the above equation, we have—

$$\frac{X'}{100} = \frac{X}{100-Y}$$

which can be expanded in the form of the simple proportion—

$$\frac{A}{B} = \frac{C}{D}$$

By carefully retracing the particulars of the graph given here, you can make up your own working copy. Then, as described in the problem and solution above, carry through your own specific (A) and (B) lines to get your X answers on the X scale.—*Joseph T. Hogan, Chemical Engineer, New Orleans.*



Pallet Base Makes Machine Portable

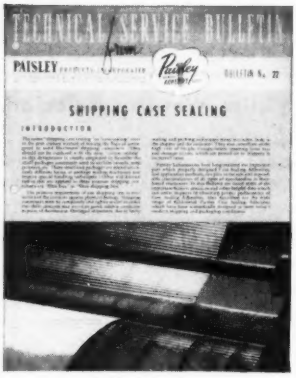
When our seldom-used, manually-controlled closing machine was permanently mounted on a pallet, two advantages were gained: The machine can now be placed in, or removed from, the production line in minimum time and with almost no labor.

Furthermore, the machine is now driven by its own motor, mounted on the pallet, instead of from an overhead line-shaft (not available in our plant).

When, on occasion, it is necessary to set up a line for a run of a specialty item packed in cans closed by the manually operated unit, a forktruck picks it up and places it in correct position in a matter of minutes—removes it equally easily when the operation is completed.

Pallet on which the closing machine is mounted is the standard type, used for stacking many products transported from production line to warehouse. Only difference: Spaces between the cross-members were planked—for added strength as well as appearance. Pallet has made a sturdy base which makes handling easy.—*R. Bradshaw, Plant Engineer, H. A. Johnson Co., Boston.*

PAISLEY has long championed the *scientific* development and application of adhesives. We have therefore become widely known as the leading source of much authoritative literature and information on adhesive operations of every type and variety. Wherever an adhesive problem exists, our skilled adhesive engineers will gladly make a thorough laboratory analysis and recommendation of the ONE best adhesive to use. Write or phone our nearest field man (consult your telephone Red Book). Or, mail the coupon for the literature or service you want. There's no cost **or** obligation.



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- ☐ Shipping Case Sealing Bulletin No. 22
- ☐ Cooler-Proof Bottle Label Glue Bulletin No. 15
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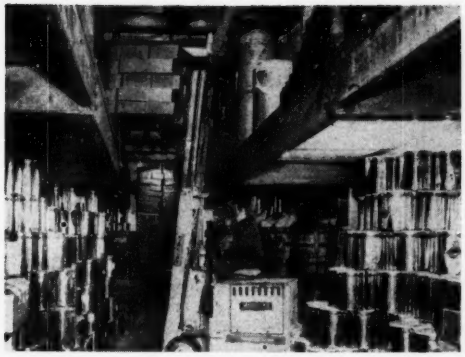
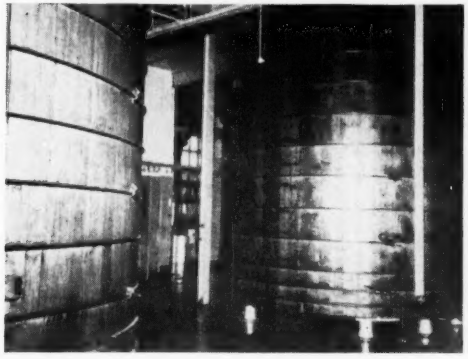


Balconies Increase Storage Capacity

Through the combination of balcony construction and use of a fork-truck to load and unload the overhead platforms, Liebmann Packing Co., Green Bay, Wis., has increased frozen-food storage capacity by 80 percent.

Furthermore, fork-lift handling of products to the full capacity of the warehouse is now done by just one man, whereas previously four men were required to load the smaller space by hand. Cost of this balcony-and-truck combination was equaled by savings in 18 months.



New Way to Protect Wood Tanks

An occasional coating of raw-linseed oil has done wonders in improving the surface condition of wooden tanks used in our plant for processing and storing wines. Application of oil to tank surfaces has these advantages:

1. Appearance of tanks is greatly improved. After oiling, surface has a dull gloss which is long lasting. The effect registered is one of cleanliness and sanitation.

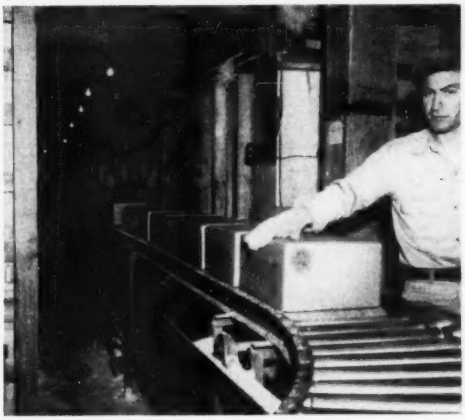
2. Outer surface cracks close soon after oil treatment and remain tight for an extended period. Any opening of cracks between staves is an indication another coating is due.

3. General sanitation is improved and cleaning requirements are reduced. The mere fact that surface cracks are closed, makes it easier to maintain sanitation. Surface cracks are ideal lodging areas for bacteria laden dust. Washing is minimized when cracks are tightly closed.

Then, too, the tanks become smooth from oil applications. They wash easily and without the surface remaining damp. Water is shed, not absorbed.

4. Rusting of tie-rods is retarded. Oil protects them as well as the wood. Even when some rusting occurs, the typical brown stains on wood beneath metal hoops or rods are absent. Rusty water does not reach the wood. If there is any evaporation on the surface, the temporary discoloration can readily be dusted away.

Raw linseed oil application does not leave a lasting nor unpleasant odor, nor does it penetrate far enough into the wood to effect, in any way, the contents of the tanks.—*Emanuel Frangione, G. F. Heublein & Bro., Hartford, Conn.*



More Storage With Two-Way Conveyor

Not only was additional space made available for frozen foods in our warehouse, but also in-and-out handling was speeded when two-way conveyors were installed.

From feed conveyors, cases are delivered along all aisles in the storage warehouse on roller-belt conveyors. Level for incoming cases is waist high, a convenient height for fast unloading and stacking.

Outgoing cases travel on a belt just above the floor, moving in reverse direction to the top conveyors. The lower conveyors, though near the floor, are also at a convenient height. It is easier to slide boxes on at this low level than to lift them to a carrier waist high, or above.

With the new arrangement, allotment of warehouse space to handling is kept to a minimum—just that required for the double-decker conveyors and passage way for workers. Movements, too, are simplified, for stacks are always near the point of loading or unloading.—*J. J. Wittengton, Plant Manager, John H. Dulovy & Sons, Inc., Exmore, Va.*

Prevents Underground Electrolysis

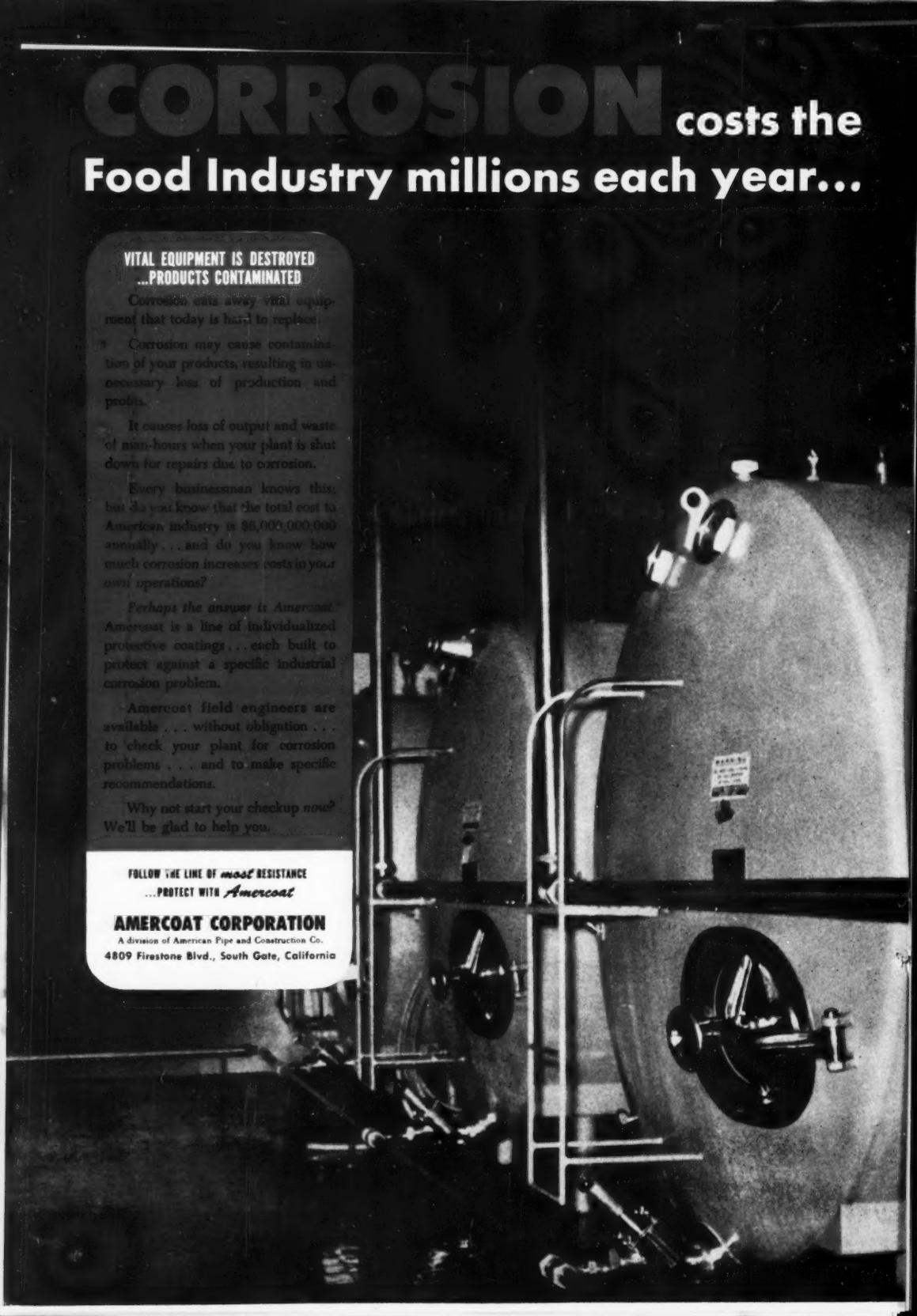
Corrosion and failure of lead-sheathed cables, bursting of steel pipes, and weakening of metal building members resulting from subsurface electrolysis, can be avoided by connecting buried magnesium bars to the underground cables.

When dissimilar metals are in contact in a conducting liquid, including moist earth, an electrical current flows from the metal least resistant to corrosion to the one most resistant, causing the former to disintegrate.

But this electrolytic disintegration can be prevented by a current flow in the reverse direction.

It has been found by U. S. Steel Co.'s laboratory that

CORROSION costs the Food Industry millions each year...



VITAL EQUIPMENT IS DESTROYED ...PRODUCTS CONTAMINATED

Corrosion eats away vital equipment that today is hard to replace.

Corrosion may cause contamination of your products, resulting in unnecessary loss of production and profits.

It causes loss of output and waste of man-hours when your plant is shut down for repairs due to corrosion.

Every businessman knows this; but do you know that the total cost to American industry is $6,000,000,000 annually . . . and do you know how much corrosion increases costs in your own operations?

Perhaps the answer is Amercoat. Amercoat is a line of individualized protective coatings . . . each built to protect against a specific industrial corrosion problem.

Amercoat field engineers are available . . . without obligation . . . to check your plant for corrosion problems . . . and to make specific recommendations.

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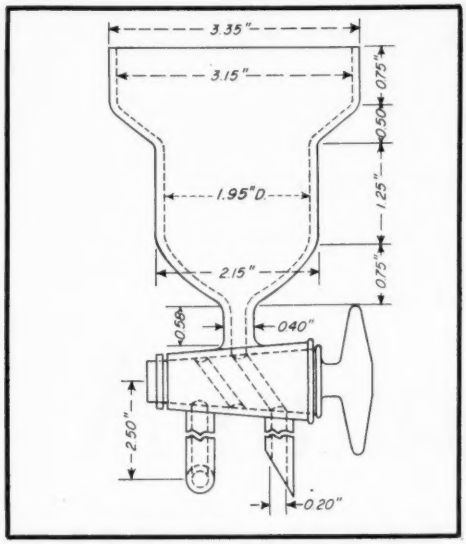
magnesium, is one of the most effective metals for setting up a current from itself to copper, lead, or steel. In short, the magnesium thereby can become the material corroded by electrolytic action in place of the metal normally distintegrated.

So, when magnesium with its high "anodic potential" is buried near and connected with underground cables, resulting electrolysis corrodes only the easily replaced magnesium.



Improved Titration and pH Method

A specially designed titration cup employed in our laboratories has not only made pH determinations and titrations easier, but also much faster.

Formerly, the titrations and pH checks, necessary in controlling conversion of starch to dextrose sugar, were performed using Beckman Model 2-H pH meters, which come equipped with a small 50-ml. beaker for holding the liquid while determining the pH. Disadvantage was the lifting of the electrodes each time a new sample was sent up, also the washing of the electrodes between each determination. Not only was considerable time consumed, but also electrodes were subjected to excessive abuse.

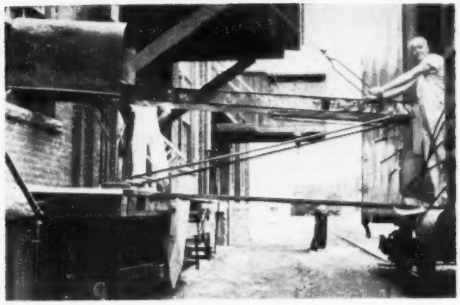
An improvement was in order, and this was the shortcut adopted:

Still using the Beckman unit with 24-in. electrode leads, we now have alongside the machine a laboratory ring stand to hold the apparatus, which includes an agitating motor, two burettes (acid and base), a clamp for holding the electrodes, and a three-prong clamp for the titration cup (see sketch).

The cup is the important innovation because it enables the operator to change samples without moving electrodes or cup.

The sample in the cup may be discarded via the side drain, or it may be saved by dropping it down into a receiver.

This type set-up, used in all of our companies' laboratories, has speeded operations, improved accuracy, and reduced the wear on equipment.—*William G. Eccleston, Corn Products Refining Co., Corpus Christi, Tex.*



Roadway Spanned by Folding Conveyor

By means of a counter-balance, a hinged roller conveyor for feeding cases to box-cars can easily be lowered across a truck passageway and raised again after use by a single worker. A few lengths of pipe makes the conveyor self supporting in the lowered position.

In our case, the railroad spur is far enough from the side of the plant to allow trucks to load from cars or unload into the plant. Formerly, the spanning of the roadway from plant to car with the heavy roller conveyor was a rough job for several workers. But now it's a simple matter to drop the hinged car-feed conveyor into place.

In making the change, there was the problem of firmly supporting the extension, when lowered, to withstand travel of the cases. This was done by building a narrow U of pipe and fittings and hinging it about 3 ft. below the hinges of the conveyor.

As the conveyor comes down, this U-support slides in a guide made of rods bolted to the conveyor frame, in such a way that the U-support rests against rod anchorage to form the support at the extended end of the conveyor.—*Herbert D. Bahrenburg, Plant Engineer, Maltex Co., Burlington, Vt.*

Label Adhesive Made Grease-Proof

To dilute the adhesive used on glass container labels, a small amount of liquid detergent with wetting-agent properties is recommended, instead of merely water or other solvent. This will overcome a most troublesome characteristic of adhesives—their inability to stick to a grease-film-coated surface.

Even though glass containers are cleaned prior to filling, the touch of a hand for aligning, or merely the grease content of the air can prevent proper adhesion of labels to jars. And oil film may also be encountered on the labeler as well as the container. On some machines, any grease on the transfer rolls or pick-off plates will result in uneven glueing.

Liquid detergent added to dilution-water, or other solvent in adhesive make-up, has other advantages as well as solving the problems of oil film:

1. Flow properties of adhesive are improved with no sacrifice of tack, thus insuring uniform coating of adhesive even when glue film is very thin. This minimizes possibility of glue being forced beyond label edges, causing smears on container.

2. Wetting action of detergent is beneficial, especially to varnished labels, counteracting inherent stiffness and eliminating curling and feathering of label edges, thus assuring complete contact between label and container.

3. Addition of detergent to adhesives also makes glue pot clean-up faster and easier.—*Marvin D. Klein, Plant Manager, Grocers Specialty Co., Cleveland.*

A Timely Message to the Margarine Industry *

PFIZER Vitamin A

Excels for MARGARINE

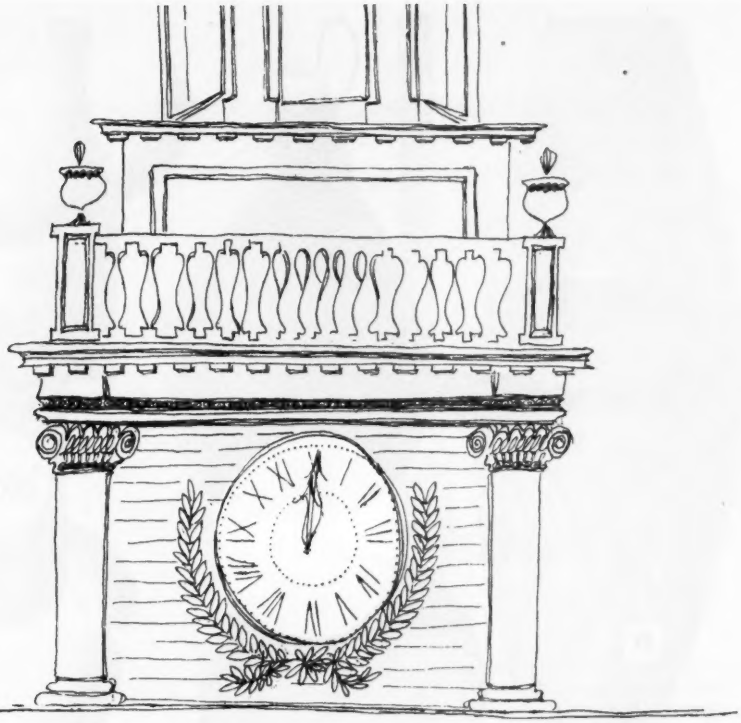
• Now...a new pure Vitamin A becomes available to the margarine industry — Pfizer pure Crystalline Vitamin A Acetate dissolved in Cottonseed Oil. This product is the result of long research and testing in Pfizer laboratories. In fortifying your margarine, it will prove both profitable and easy to use. Check these noteworthy advantages:

This product is odorless and tasteless. Its blandness assures you that it will blend perfectly with other ingredients and there is no danger of off-tasting, off-odor batches.

It is highly stable both by itself and when incorporated in margarine. This can mean real savings since excess overages will not be required.

Pfizer Crystalline Vitamin A Acetate in Cottonseed Oil is uniform. Every shipment meets the rigid quality control maintained by Pfizer for over one hundred years. Supplied in batch-size cans, Pfizer Vitamin A for margarine is packed for your individual requirements. It will not crystallize at refrigerator temperatures. No change in handling procedure is necessary.

**Refer to Applicable F. D. A. Standard of Identity*



Fortification!

Pfizer is a dependable source. Year-in and year-out your requirements will be met from the newly expanded plant at Groton, Connecticut — one of the largest, most modern vitamin plants in the world. We think you'll agree that your margarine deserves the product that offers all these advantages... Pfizer Crystalline Vitamin A Acetate in Cottonseed Oil. We will be most happy to discuss your requirements with you. *Phone or write:*

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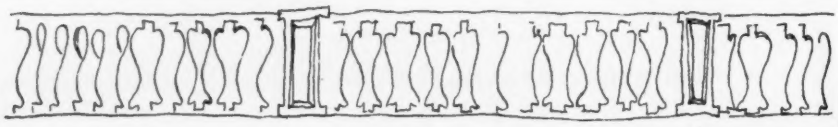

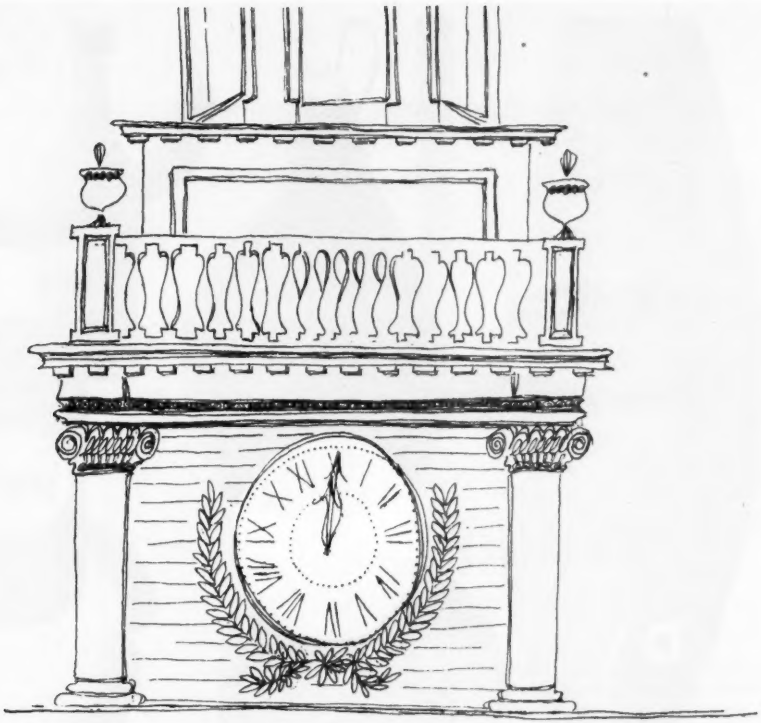

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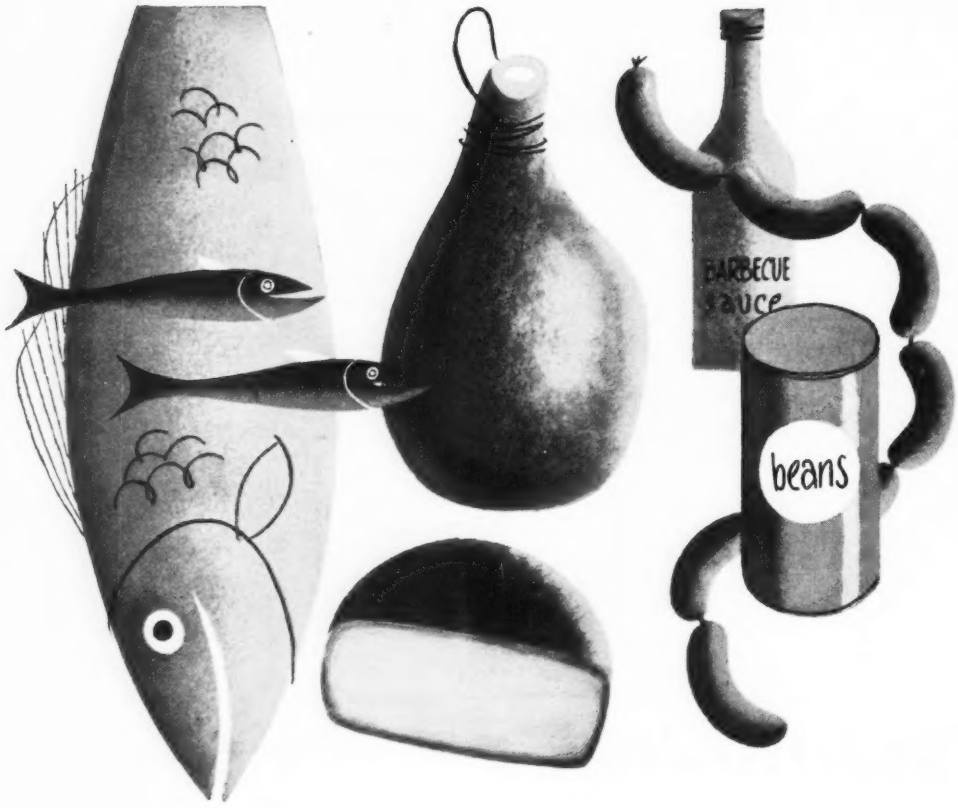

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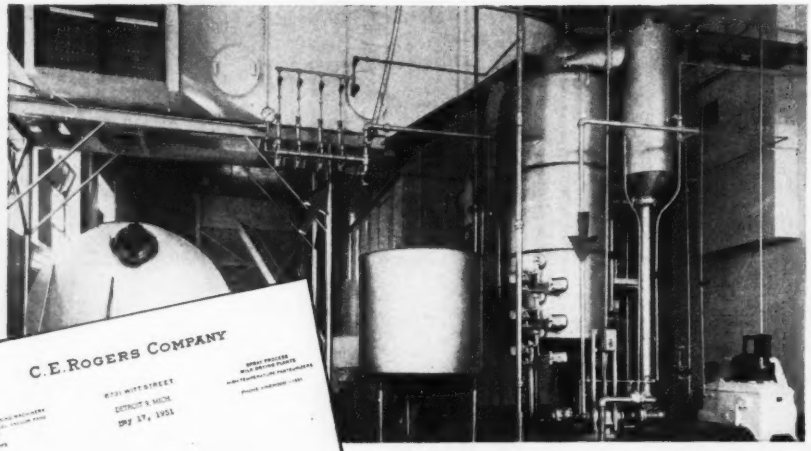

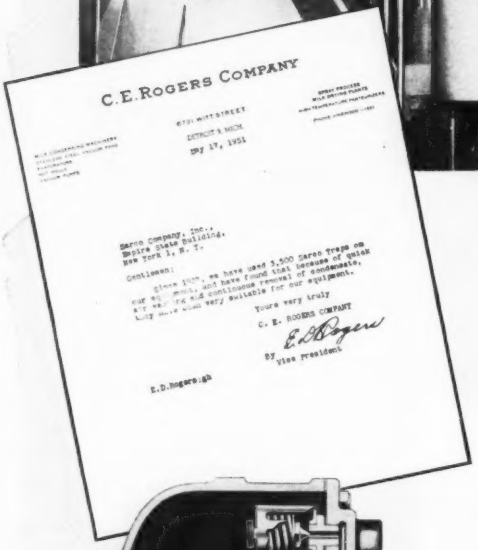

C. E. ROGERS COMPANY

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May 17, 1951

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Gentlemen:

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Yours very truly

C. E. ROGERS COMPANY

By E. D. Rogers
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Six Sarco Float-Thermostatic Steam Traps, type FTL on vacuum pan for condensed milk. With 26" of vacuum and 5 psi steam pressure this pan can evaporate 32 lbs. of water per square foot of heating surface. At top, left center, four Sarco high pressure float-thermostatic traps, type FTH, draining fin type air heaters on spray drier. The quality of Sarco products is reflected in the efficiency of the equipment they serve.

The Rogers family of Detroit, back in 1883, pioneered the vacuum pan and ever since has been a leader in the manufacture of quality equipment for condensing and spray drying milk.

Realizing early that rapid heat transfer was essential to obtaining maximum capacity with minimum steam consumption, they patented a steam coil design providing a separate condensate discharge for each turn of every coil.

SARCO FLOAT-THERMOSTATIC STEAM TRAPS

fitted to these outlets, get rid of the condensate continuously, as fast as it forms. The built-in Sarco air vent prevents air and non-condensables from retarding heat transfer.

Ask for new Bulletin 453

Sarco Float-Thermostatic Steam Trap. Large capacity at minimum pressure-differential. Air binding is impossible. Available in six sizes for pressures to 200 psi.

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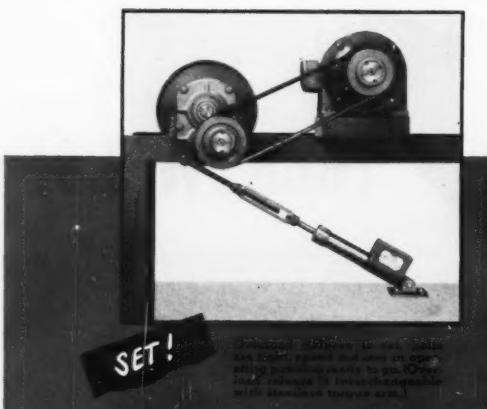

Now . . . another great development by Dodge . . . that provides instant and positive protection for driven machines, motors, and the famous Torque-Arm Speed Reducer itself! The new Dodge Tri-Matic Overload Release prevents breakdowns, avoids expensive repairs, insures your production against costly interruptions.

Here's a worthy companion to other Dodge achievements in power transmission machinery, such as Taper-Lock Sheaves, Dodge-Timken Bearings, Rolling Grip and Diamond D Friction Clutches. Dodge Torque-Arm Speed Reducers, which have brought dependable speed reduction to industry's machines at great savings in cost, are available in two series—Single Reduction and Double Reduction—with capacities from 1 hp to 43 hp, speeds from 12 to 330 rpm.

Write for special data on Torque-Arm Speed Reducers and the new Tri-Matic Overload Release.

CALL THE TRANSMISSIONEER your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on time-and-cost-saving methods. Look for his name under "Power Transmission Equipment" in your classified phone book.

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Tri-Matic Overload Release

FOR THE FAMOUS DODGE TORQUE-ARM SPEED REDUCER

1 ***LOOSENS THE BELTS***

2 ***CUTS OFF POWER***

3 ***GIVES A WARNING***

Protects Your Machines

Mechanically . . Electrically

POSITIVELY!

- The Dodge Tri-Matic Overload Release is a simple, positive acting unit that replaces the standard torque arm that is regularly furnished with the Dodge Speed Reducer. (The two are interchangeable.)
- Pressure exerted by an excessive load causes a piston to move lengthwise through the unit, activating the mechanism instantly.
- This movement shortens the torque arm, loosens the belts and cuts off current simultaneously.
- A warning system can be hooked up to the micro switch of the Tri-Matic—to activate bell, siren or light.
- The Tri-Matic is calibrated for adjustment to the load conditions of any job. It can be set to act at any desired load up to the reducer's maximum capacity.
- It is easy to reset the Tri-Matic. Just pull the speed reducer back into position. This automatically cocks the release mechanism.
- The Dodge Tri-Matic Overload Release is available from distributors' stocks in sizes for all Dodge Torque-Arm Speed Reducers —in either single or double reduction series.

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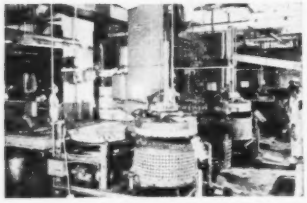
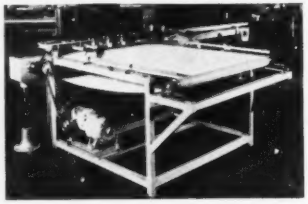
Three of our many installations, which have proven profitable to food packers, are illustrated and described below. These are offered as examples of the results of our work in collaboration with food packers and on specific problems. If you have similar or other problems in your plant it will pay you to talk to a Barnes' process engineer. There is no obligation for this service.



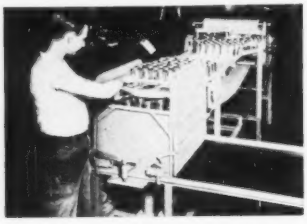
Load 500 Jars Per Minute

This Barnes retort crate loader handles 500 baby food jars per minute. It is one of many different machines designed and manufactured by Barnes to help the food packer lower costs, speed up handling, and minimize breakage.



Unscramble 500 Jars Per Minute with Barnes Single Filer

Here's a new, efficient method of unscrambling empty jars. The illustration shows operating end of machine where girls are positioned while dumping cases of glass onto the receiving conveyor belt. Jars are discharged to conveyor at the rate of 500 to 600 per minute, determined by size and shape.



Unload Over 600 Cans Per Minute with Barnes Packaged Can Unloader

This new dual purpose machine can be operated with only two men in continuous production while unloading 3 to 4 bags of cans per minute. The Barnes unloader handles 3 bags, each containing 265 No. 303 cans per minute, or 795 cans.

FREE ADDITIONAL DATA on these and other time and money savers for the food packer will be sent upon request. Write today. Ask for bulletin 352.

W. F. and JOHN BARNES

PROCESS EQUIPMENT DIVISION 229 SOUTH WATER STREET, ROCKFORD, ILLINOIS

Up to the Minute News On Aseptic Canning

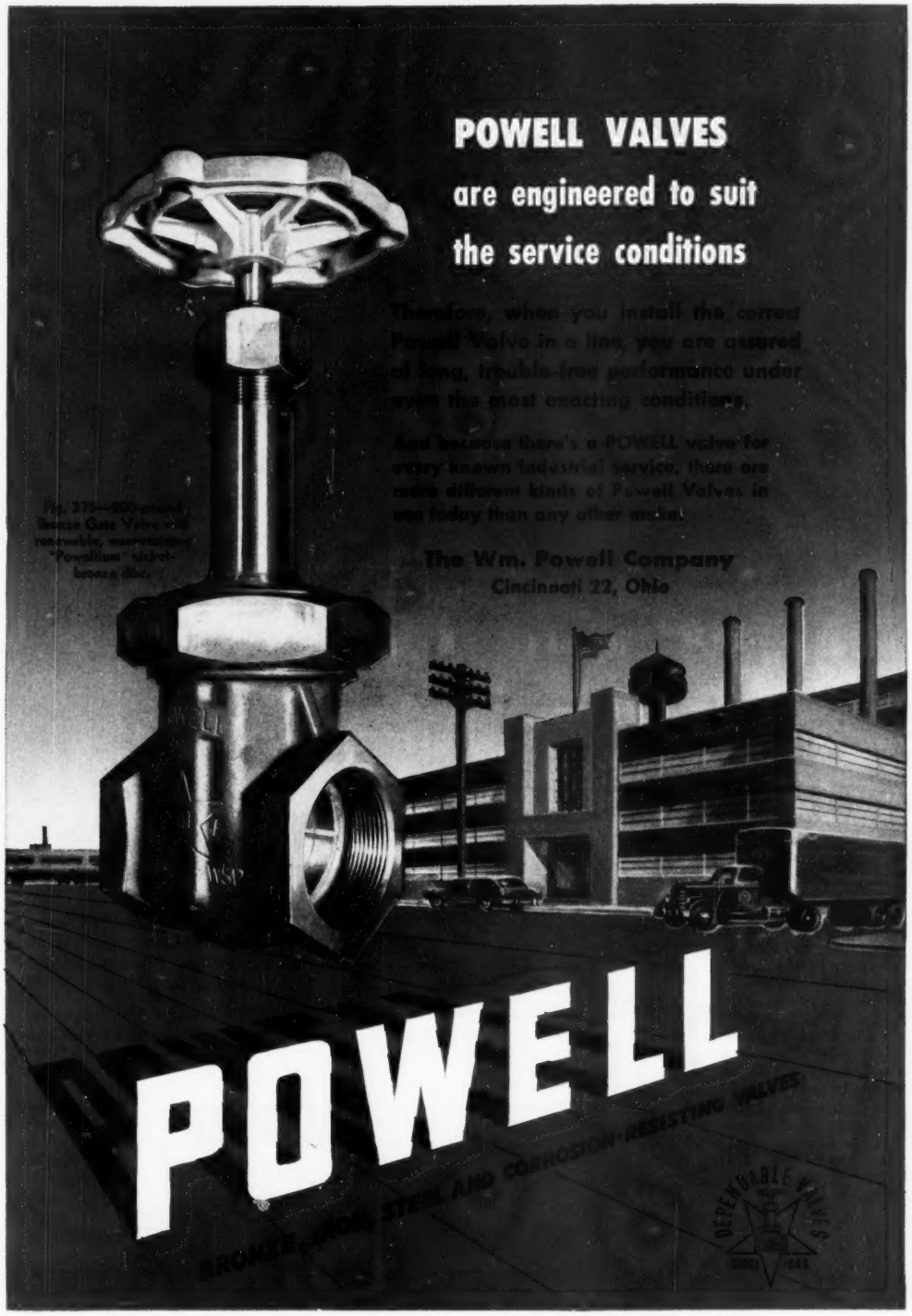
Many canners are investigating the possibilities of putting up their products with the Martin Aseptic Canning System. Milk and milk products such as chocolate milk can be canned successfully with this new process. Vegetables and fruit products and juices are being canned commercially. The first product canned in this category was the famous Andersen's Split Pea Soup. This soup is being canned without losing flavor or color of the homemade style soup.

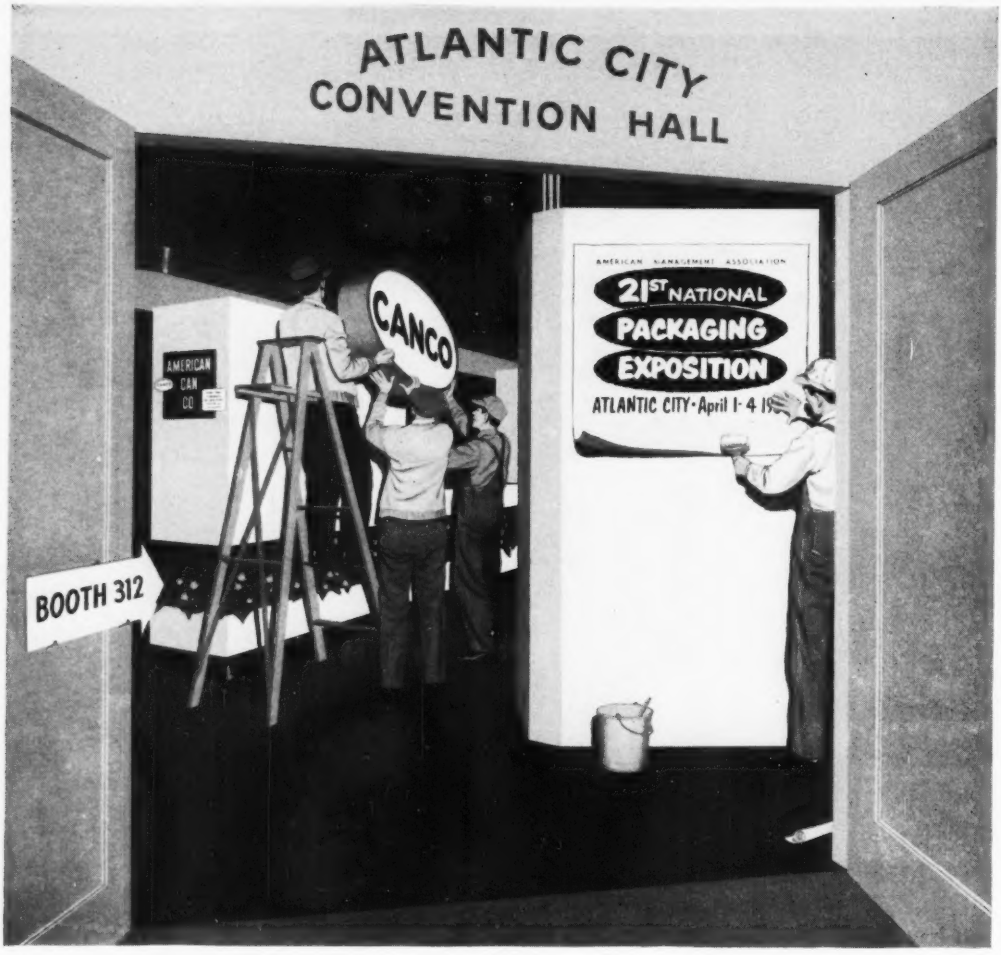
3 Large Dairies Install Pilot Lines for Canning Fresh Whole Milk

One of the most amazing results of this new process is canned whole fresh milk. Imagine what this means to milk starved areas such as Alaska alone. Also, think of the simplicity of distribution as compared with present day methods. Two large dairies are now canning fresh milk commercially and three more have installed pilot lines for milk and other milk products.

Banana Puree Soon To Be Available in Cans

Bananas have high nutritive value, they also are highly perishable. But, soon, the housewife and mother will be able to obtain banana puree for infant feeding and baking — out of cans. This, again, is a revolutionary canning job made possible and simplified with the Martin Aseptic Canning System. We at W. F. and John Barnes, as sales agents for this process, are glad to be able to bring it to the food packer. Call in a Barnes technician for further discussion. There is no obligation for this service. Write W. F. and John Barnes Company, Process Equipment Division, 301 South Water Street, Rockford, Illinois.


POWELL VALVES
are engineered to suit
the service conditions
Therefore, when you install the correct Powell Valve in a line, you are assured of long, trouble-free performance under even the most exacting conditions.
And because there's a POWELL valve for every known industrial service, there are more different kinds of Powell Valves in use today than any other make.
The Wm. Powell Company
Cincinnati 22, Ohio
Fig. 272—600-pound bronze Gate Valve with renewable, wear-resisting "Powellium" nickel-bronze disc.
POWELL
BRONZE, IRON, STEEL AND CORROSION-RESISTING VALVES
DEPENDABLE VALVES
SINCE 1846

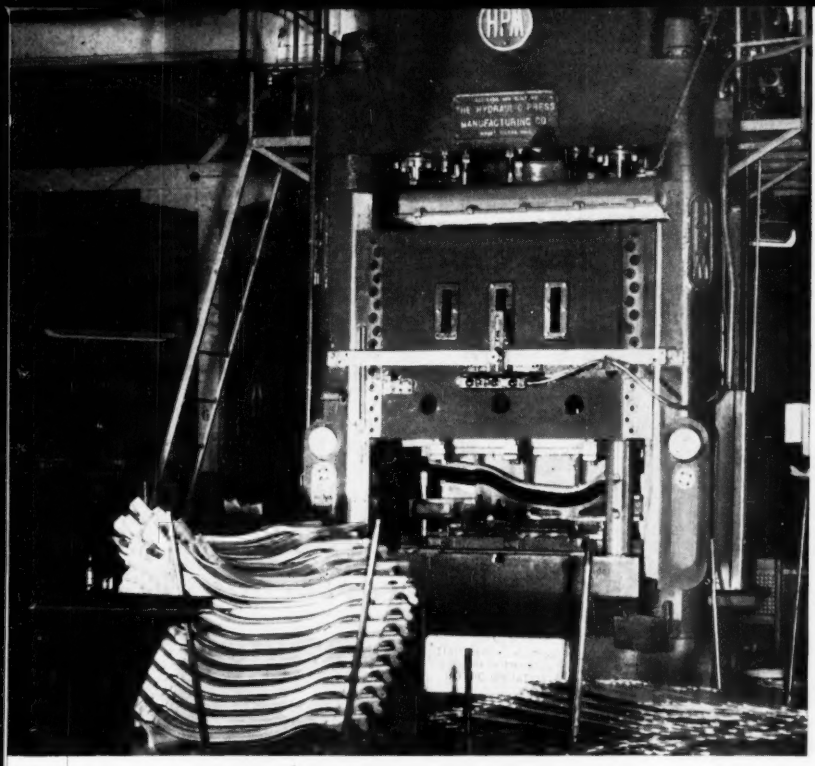


We're busy getting ready for the Packaging Exposition in Atlantic City the first of April.

You are cordially invited to visit with us there during the exposition . . . to sit down with us and talk over any packaging problems you may have.

We're hoping to see you . . . so, stop in, won't you?

AMERICAN CANCO CAN CO.
NEW YORK
CHICAGO
SAN FRANCISCO
HAMILTON, CANADA



Send for this booklet...

Gain these benefits for your hydraulic operations

THE BIG 400-ton hydraulic press shown above is used to stamp out parts for farm machinery in a big midwest plant.

When the press was first put into operation, plant operators followed the recommendation of a Standard Oil lubrication specialist and used STANOIL Industrial Oil in the hydraulic system. In over four years of continuous hard service, there has been no lost time because of inefficient performance of the hydraulic oil.

Oil capacity of the system is approximately 9 barrels; only 2 barrels make-up per year has been required. The oil in this system has never been changed. It has been centrifuged once to remove moisture which accumulated over three years' operation. Periodic tests of oil samples have shown that STANOIL Industrial Oil has maintained its high lubricating quality. A recent analysis showed no increase in viscosity of the oil, no change in color, and a neutralization number of only 0.13 mg. KOH/gm.

STANOIL
TRADE MARK
Industrial Oil

You can rely on this unique many-purpose oil to give you the same clean, dependable service. Get the expert help of a Standard Oil lubrication specialist by phoning your local Standard Oil office.

Or write: Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

See what Stanoil offers you...

You'll find the means to significant savings in this booklet. It describes the important qualities of STANOIL Industrial Oil and the resultant benefits which have made this multi-purpose oil the choice of midwest manufacturers for a host of important lubricating jobs. Discover how STANOIL will give you superior protection through its unique combination of six outstanding characteristics, including high stability and effective rust prevention. Find how STANOIL can simplify stock, storage, and inventory in your plant by replacing special-purpose oils in hydraulic systems, speed reducers, air compressors, machine tools, electric motors, auxiliary turbines, and a wide variety of circulating, bath, and bearing systems. Ask the Standard Oil lubrication specialist from your nearby Standard Oil office for this booklet, or write: Standard Oil Company (Indiana), 910 S. Michigan Ave., Chicago.

STANDARD OIL COMPANY **STANDARD** *(Indiana)*

WESTINGHOUSE
RESET
Life-Linestarter
PAIRED FOR PRODUCTION
Life-Line motor
WESTINGHOUSE
DO NOT LUBRICATE

Insure

machine performance with this matched pair

Motors and controls can make or break the performance of your machine tools. Why speculate? Life-Lines assure peak performance under all conditions. Take these, for example:

Accidental blows to starters? Will false operations result? Not with the Life-Linestarter®. Its inverted clapper-type design provides positive operation.

Contact life? Life-Linestarter contacts last longer, why? Because the exclusive "De-ion"® arc quickly divides, confines, and extinguishes the arc. Contacts, therefore never need filing.

Bearing lubrication? Life-Line motors prelubricated, sealed-for-life bearings eliminate this problem. These bearings need no lubrication. And because they are sealed, there's less chance for grit and dust to harm the bearings.

Physical abuse? Falling objects, excessive vibration, corrosive atmospheres—all take a heavy toll of weak motor frames. Thousands of installations have proved that Life-Line's steel frame stands up to physical and chemical abuse better than conventional frames. Steel adds strength without additional weight.

Consider the many other features of this motor and control production team—"paired for performance." Your Westinghouse representative has the facts. Ask him for copies of "Life-Line Motor Book" B-3842 and "Tomorrow's Starter Today" B-4677. Or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-21638

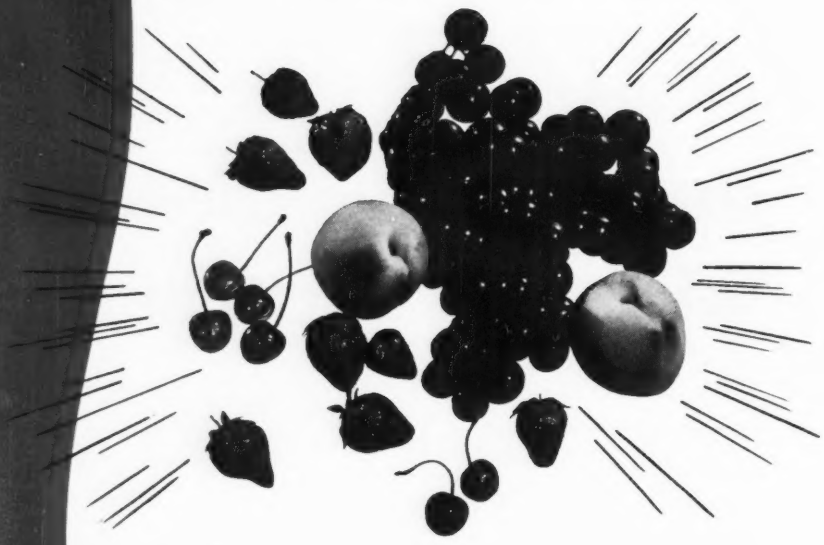
YOU CAN BE SURE.. IF IT'S

Westinghouse

Life-Line

MOTORS and CONTROLS

THERE IS SOMETHING NEW



IN *TRUE FRUIT* FLAVORS!

By adopting and improving on the new discoveries in fruit concentration WITHOUT THE USE OF FLAVOR KILLING HEAT, the ALVA laboratories now offer True Fruit flavors containing a considerably higher percentage of the fugitive volatile essences so vital to the fresh, true flavor of natural fruits.

Normally lost in distillation, these essences are initially captured and ultimately returned to the concentrate in the unusual equipment built by ALVA technicians. The result is a concentrate that is fresher, possesses more body and will go further in natural flavoring.

This remarkable technique is now standard in the production of ALVA True Fruits.

There's a difference . . . All the flavor is there . . . We'll send you samples for comparison.

Write for your copy of the complete ALVA Flavors Catalog

VAN AMERINGEN-HAEBLER, INC.
521 WEST 57th STREET, NEW YORK 19, N. Y.

Alva FLAVORS

Down go filling costs!

Pfaudler Piston Fillers show big savings for companies packaging liquid to semisolid products.

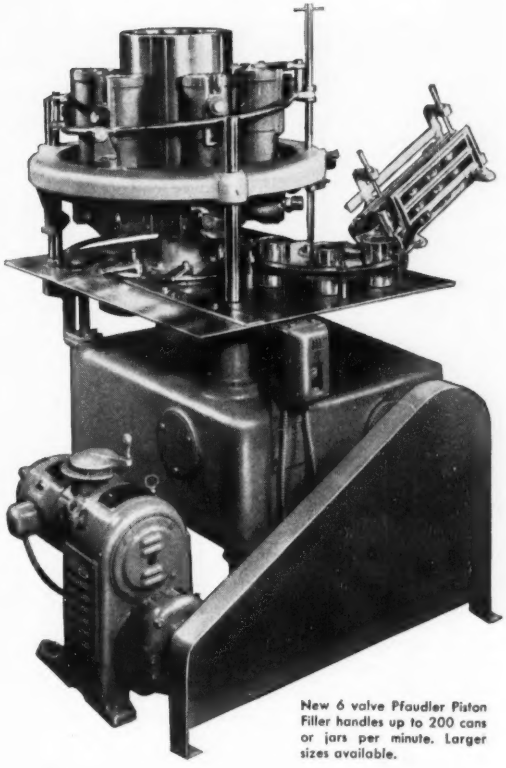
FAST—Because Pfaudler Piston Fillers deliver high-volume output at top speed, fewer fillers are needed to do the job. Capacities range from 100 to 600 containers (cans or jars) per minute, depending on viscosity of product handled. Result: saving in initial equipment.

VERSATILE—You can handle a wide variety of products with this machine—potted meats, gravies, heavy or light lubricating oils, syrups, processed cheese, to mention a few. The Pfaudler Piston Filler provides the positive action needed for accuracy of fill. Instantaneous volume adjustment controls accuracy within a fraction of an ounce.

EASY-TO-CLEAN—Hours of costly labor for cleaning are eliminated because both the pistons and self-compensating cut-off valves are removable in one piece by hand. No tools needed. Pfaudler offers this cost-saving feature exclusively! Besides, the Pfaudler "no-can-no-fill" feature protects you against wasteful spillage.

EXCLUSIVE FEATURE

Pistons and self-compensating cut-off valves easily removed by hand for fast, easy cleaning. Saves hours of work, cuts costs.



New 6 valve Pfaudler Piston Filler handles up to 200 cans or jars per minute. Larger sizes available.

See it at the National Packaging Exposition, Atlantic City, April 1-4, Booth 107, main floor.

Pfaudler

THE PFAUDLER CO., ROCHESTER 3, NEW YORK
Engineers and Fabricators of Food Processing Equipment

Gravity Fillers · Deaerators
Piston Fillers · Vacuum Pans
Steam Peelers · Evaporators

THE PFAUDLER CO., Dept. FE-3, Rochester 3, N. Y.

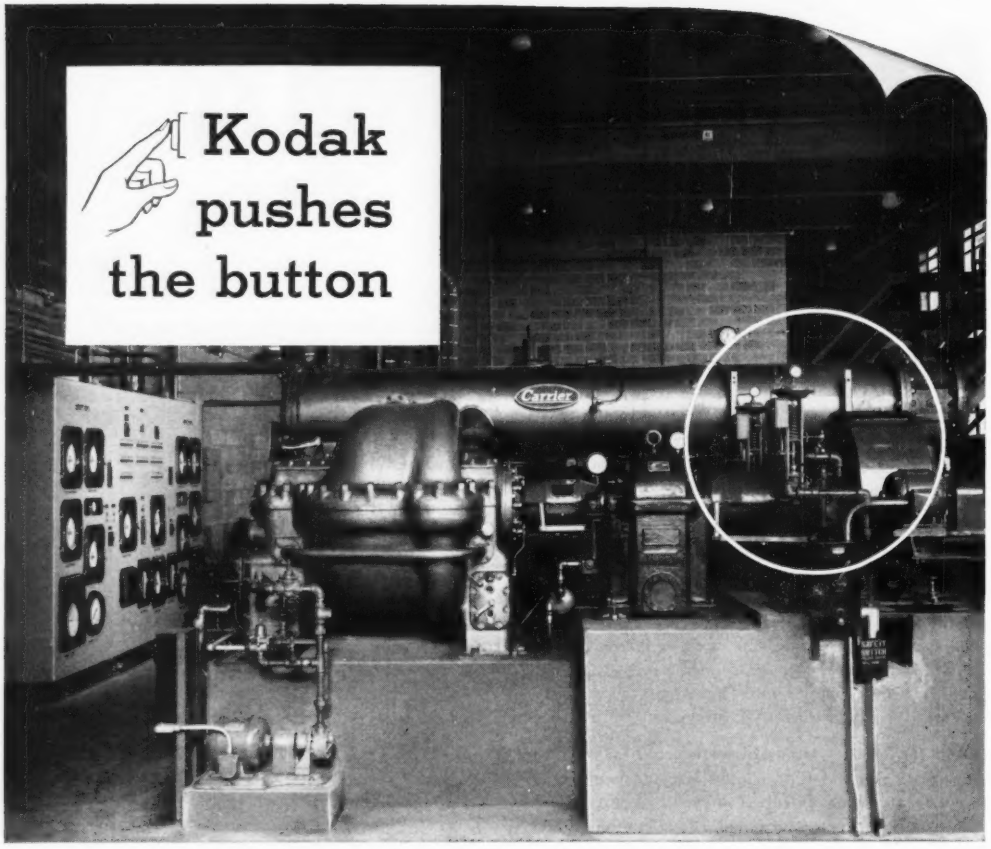
Send me the facts about Pfaudler Piston Fillers right away.

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State____



We do the rest...

in controlling the refrigeration system at Kodak's huge new Distribution Center at Rochester, N.Y.

This center handles practically every Rochester-manufactured Kodak product for storage, packing and shipping in its 476,000 square feet of floor space.

Air conditioning for storage of sensitive photographic films and papers is extremely important, and it starts off right with these 250-ton Carrier centrifugal compressors which supply the chilled brine to the Taylor controlled temperature zones . . . "the most fully automatic compressors we ever installed", say Carrier engineers about these Taylor controlled centrifugals.

Taylor controls keep the output temperature of the chilled brine constant by regulating the oil volume in the hydraulic coupler (circled) between the compressor itself and a constant speed motor. During periods of minimum load, an ingenious hot gas by-pass induces a load on the compressors to eliminate surging and keep the system fully automatic. From Friday night to Monday morning, when the load is especially light, the system automatically keeps the brine temperature constant with *no manual attention whatever.*

No matter what your air conditioning or refrigeration problem may be, you'll get most efficient operation from your equipment when it's under Taylor Control. Ask your Taylor Field Engineer, or write for **Catalog 300.** Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

PRODUCE MORE WITH YARWAYS...

Is higher production your aim?

Then Yarway is your steam trap. Best steam trap performance requires condensate drainage *plus*—

1. **Air and gas removal.**
2. **Velocity scrubbing of condensate from heat transfer surfaces.**
3. **Keeping highest average temperature in the equipment.**

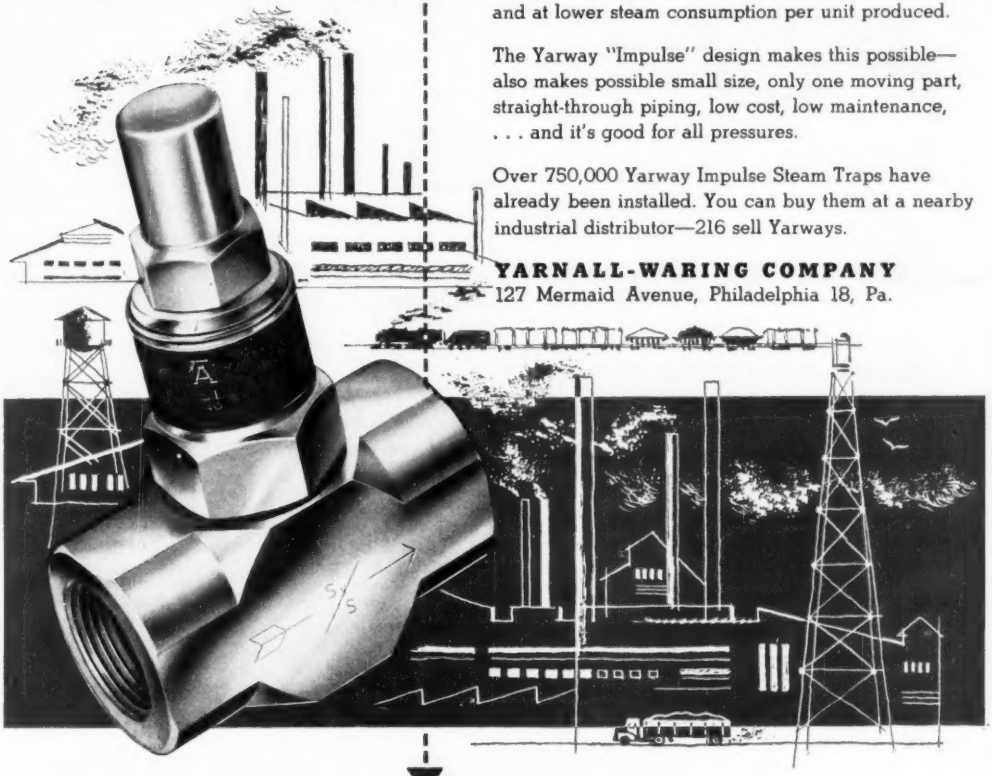
Yarway Impulse Steam Traps do all this, *sending the most premium B.T.U.'s at top temperature into your process or product.*

That's why equipment drained with Yarways gets "hotter, sooner" . . . why better quality and higher production rates are so often reported, and at lower steam consumption per unit produced.

The Yarway "Impulse" design makes this possible—also makes possible small size, only one moving part, straight-through piping, low cost, low maintenance, . . . and it's good for all pressures.

Over 750,000 Yarway Impulse Steam Traps have already been installed. You can buy them at a nearby industrial distributor—216 sell Yarways.

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.

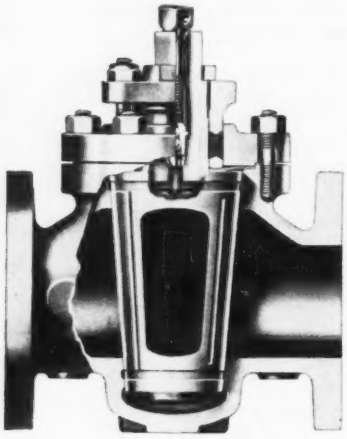


FREE OFFER
Don't take our word for it. Test Yarway's production advantages in your own plant, without cost or obligation. Drop us a card. A trial trap will be delivered promptly.

YARWAY the steam trap designed with production in mind

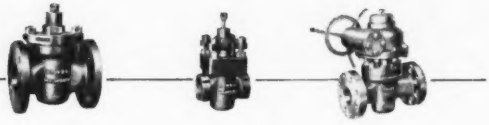
WALWORTH

Lubricated Plug Valves



for TOUGH assignments

where tight shut-off...
and easy operation
are "MUSTS"



Walworth Lubricated Plug Valves Offer These Advantages

- Complete surrounding of ports with resistant lubricant affords positive seal against leakage.
- Lubricant grooving system assures ease of operation — tight shut-off — greater protection against corrosion.
- Body and plug fully protected by lubricant from attack by line fluids.
- Quarter turn opens or closes valve.
- Made in a complete range of sizes ½" to 26" and for pressures from 175 to 5,000 psi., and for vacuum requirements.

For handling petroleum products, natural or manufactured gas, acids, alkalies, solvents, slimes, slurries . . . in fact for almost any hard-to-handle liquids—there's a Walworth Lubricated Plug Valve designed for the job.

Easy to operate, tight sealing, resistant to wear and corrosion, Walworth Lubricated Plug Valves assure long years of dependable service at low operating cost.

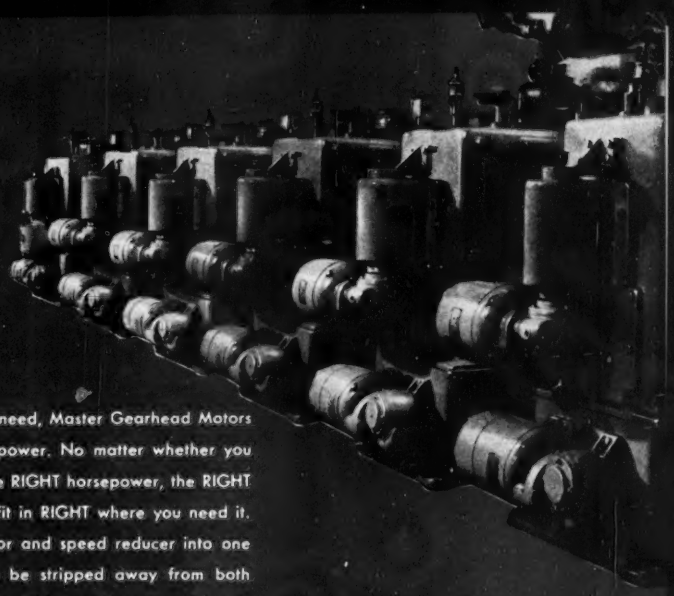
Walworth Lubricated Plug Valves are available in sizes ½" to 26" for pressures from 175 to 5,000 psi., and for vacuum requirements. For full details—prices, sizes, dimensions, and other pertinent data, see your Walworth distributor or write to:

WALWORTH

valves • fittings • pipe wrenches

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD



No matter what size power units you need, Master Gearhead Motors are the horsesense way to use horsepower. No matter whether you use big ones or little ones, you get the RIGHT horsepower, the RIGHT shaft speed in a single unit that will fit in RIGHT where you need it. The integral construction of both motor and speed reducer into one compact unit, permits many parts to be stripped away from both the power drive and the completed machine, and pays off handsomely in savings in material . . . savings in space. In big sizes or small sizes, you'll find them easy to order, easy to use . . . a great help in securing compact, clean-cut, economical designs for your equipment.

And nowhere, except in the Master line of Gearmotors, will you find power units that are so flexible, so easily adaptable, and in such a wide range of sizes and types. They are available in any size, 100 HP and smaller . . . and for all cycles, phases and voltages . . . in open, splash proof, totally enclosed, fan cooled and explosion proof types . . . with Speedrangers (mechanical variable speed) and Unibrakes . . . for every type mounting . . . and over a gear reduction range up to 432 to 1.

Increase the salability of your motor driven products . . . improve the economy, safety and productivity of your plant equipment . . . with Master Gearhead Motors, the horsesense way to use horsepower.

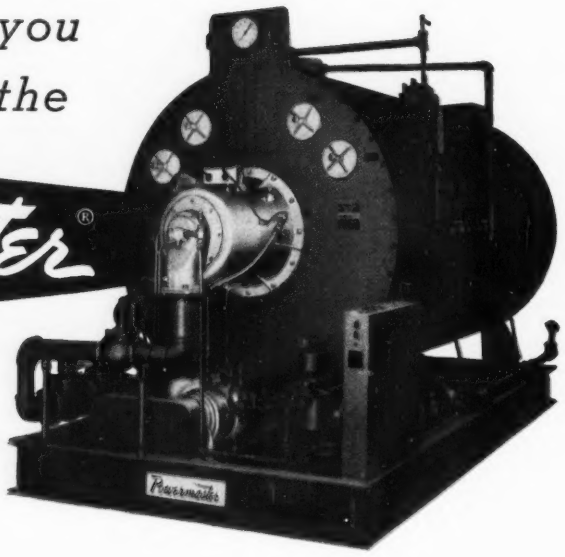
THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO

BIG ones or little ones

MASTER GEARMOTORS

to get all 3 benefits
be sure you
find out about the

Powermaster®



Model 3 *Powermaster*—15 to 500 H.P.—high or low pressure units for steam or hot water

1 *Low cost operation* for steam or hot water—because the special *Powermaster* burner design (patent applied for) gives you top efficiency when operating anywhere between 30% and 100% of boiler capacity.

2 *Less clean-up* time and money are real benefits when you use a *Powermaster*. In plant after plant, job records *prove* that the design of this packaged steam generator means less smoke, less soot to be cleaned from tubes.

3 *Get low fuel rates* by changing from either gas or oil in just a few minutes. You can use the cheaper fuel at any time. And no worries about fuel shortages, either.

To find out what is new and better about the *Powermaster*, all you do is ask for a copy of Bulletin 1218. It gives you complete details about this unit's improved safety and automatic control features. Ask us to put a copy of Bulletin 1218 in the mail for you.

only the
dependable
Powermaster®
gives you
all 3
—for steam
or hot water
at low cost

We'll mail you a copy of this book that gives the reasons why you cut operating costs with the Powermaster. Just ask for a copy of Bulletin No. 1218.

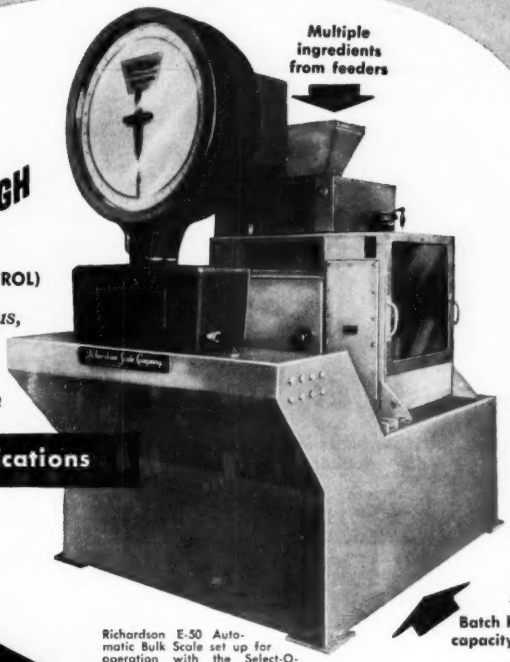
ORR & SEMBOWER, INC., *Established 1885*
940 Morgantown Road, Reading, Pennsylvania

SELECT-O-WEIGH

(ELECTRONIC WEIGHT CONTROL)

Remote, Instantaneous, Dial-Control Formula Changing and Ingredient Selection

For *PROPORTIONING* Applications

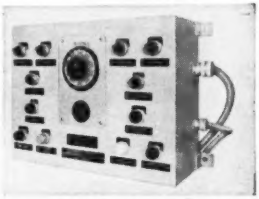


Richardson E-50 Automatic Bulk Scale set up for operation with the Select-O-Weigh. Discharge from E-50 would be through hopper to next operation on floor below.

Select-O-Weigh, Richardson's electronic weight control system, reduces the most complex formula-changing and ingredient-selection problem to push-button simplicity. For with Select-O-Weigh you select, measure, and deliver up to *twelve* ingredients from a single, pre-set, remote-automatic control panel.

Through incorporation of a simple, fool-proof electronic circuit, Select-O-Weigh changes formulas *instantly*, with the setting of a dial—no sliding poise adjustments or manual weight changing. And a single, automatic scale handles many ingredients—up to twelve or more.

Select-O-Weigh is designed for either cumulative or consecutive weighing, and can be used with many existing automatic scales.



Control panel for Select-O-Weigh handling constantly varying amounts of a single material. Weight desired is set on control dial, and compensation on smaller vernier knob below it. Multiple control dials for multiple ingredients.

The Richardson Scale Company, Clifton, N. J., will be glad to supply information on:

Feeder-Weigher Systems • Automatic Bulk Weighing Hopper Scales
Automatic Bagging Scales • Bag Sewing Conveyors • Packers
Process Control Panels and Select-O-Weigh

Please write direct to our Clifton office, or to the nearest of our branch offices, located in Atlanta, Boston, Detroit, Minneapolis, Cincinnati, Wichita, Montreal, Omaha, New York, Pittsburgh, San Francisco, Toronto, Buffalo, Chicago, Philadelphia, Houston.

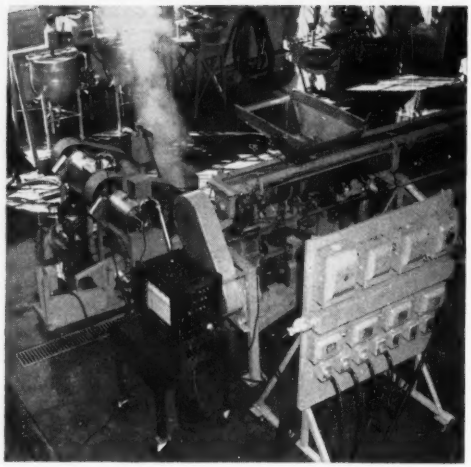
Write for Select-O-Weigh Bulletin #0351.

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

8300

EFFECTIVE INSULATION—*Used in both research and quality control, these instruments automatically record temperatures at many points in a "test wall" of paper insulating material.*

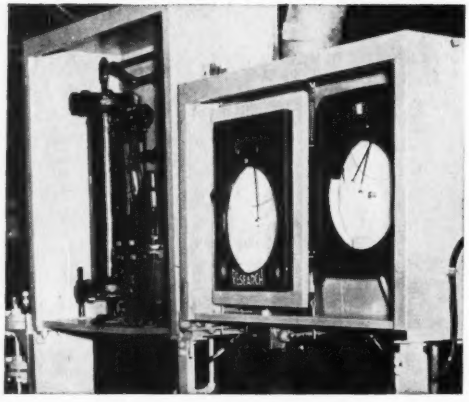


BETTER FOODS MEAN HEALTHIER BABIES—*Pilot plant at Baby Foods Division of Gerber Food Products makes use of* **ElectroniK** *recorder to check all-important processing temperatures during test runs.*

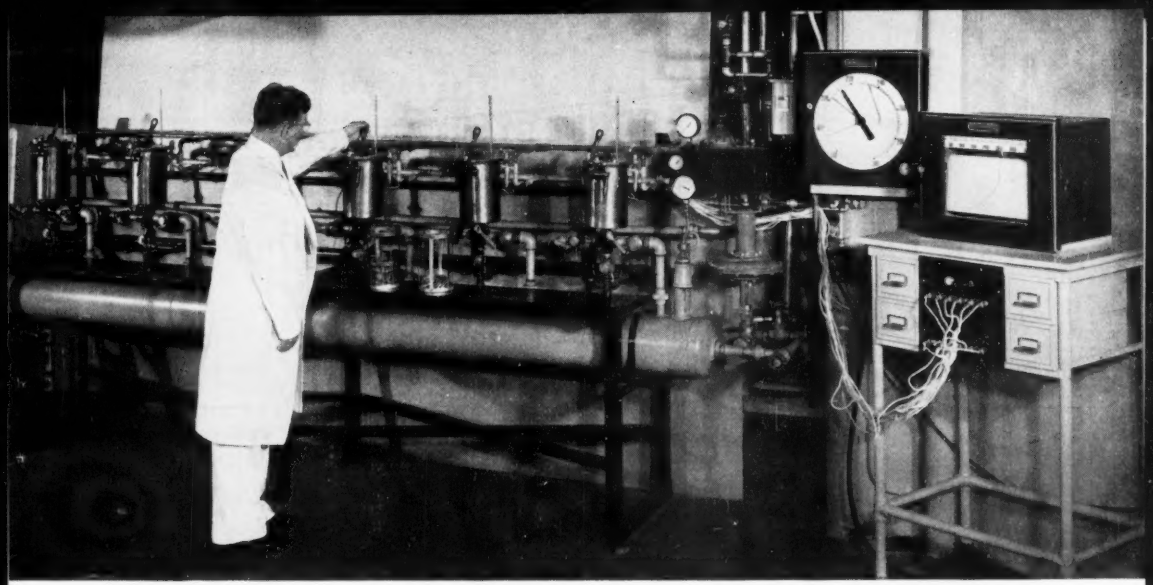
For all of industry... *especially*

Instruments

TORQUE MAGNETOMETER *used by researchers at United States Steel Corporation tells whether a steel sheet can be "drawn" into a deep cap for a ketchup bottle. Shape of curve drawn by recorder pen tells the magnetic, hence the shaping, story.*



FILAMENTS FOR FABRICS — *These instruments, in one of America's foremost rayon plants, are contributing to the stability of pilot plant processing in the development of finer filaments for tomorrow's fabrics.*



CANNED FOODS RESEARCH *is simplified by recording and controlling instruments in the laboratories of Continental Can Company, Inc. Circular chart instrument controls temperature in miniature retorts used for special test cans . . . strip chart instrument records temperature in each retort.*

When this advertisement appeared in the January issues of Food Engineering and Food Technology the installation pictured above was incorrectly credited.

for the food industry

accelerate research

THE DRAMATIC achievements of the Food Industry in recent years have stemmed from close cooperation among process specialists, equipment designers and instrumentation engineers.

Today's researchers get things done in a hurry. In many food laboratories, a variety of Brown instruments are faithfully recording temperature, pressure, flow, humidity, pH . . . and other variables important to laboratory, pilot plant and process alike.

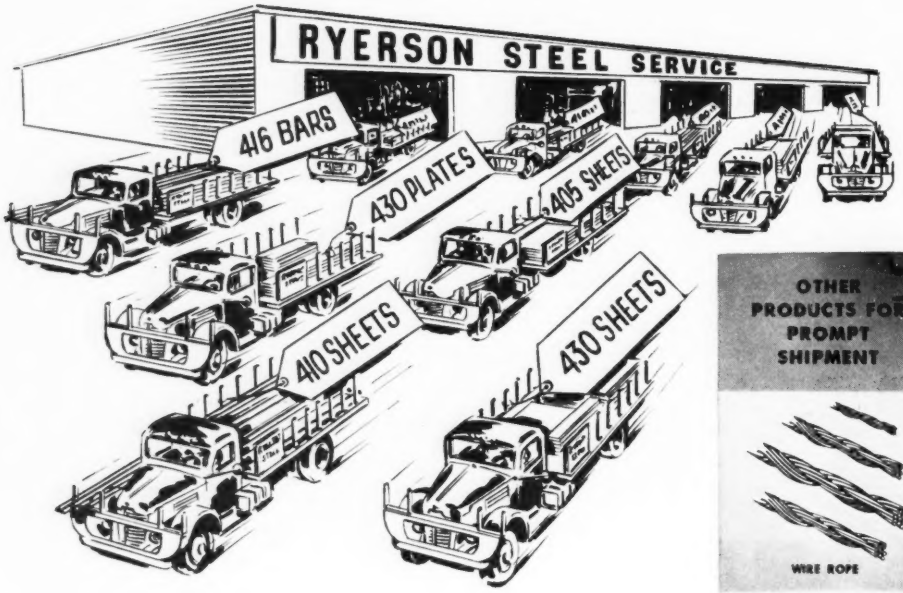
Brown instruments and controls are helping to accelerate research, are helping to speed new ideas from the drafting boards to practical realities. Even now, more new developments are in the offing, incorporating new techniques and new controls.

Our local engineering representative will welcome the opportunity to discuss your instrument requirements . . . for research or process operation. Call him in today, he is as near as your phone. MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4502 Wayne Ave., Philadelphia 44, Pa.

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

● *Important Reference Data*

Write for 84-page bulletin "Instruments Accelerate Research" . . . and Data Sheets on instrumentation for a variety of specific applications.



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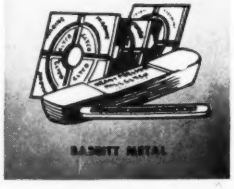


New Advance In Canned Fresh Milk

Handling and processing improvements are reported engineered by Golden State . . . And resulting economies are seen "working" with low distribution costs to bring the retail price tag down to that of bottled milk

C. R. HAVIGHORST
Associate Editor, "Food Engineering"

Another stride in the aseptic canning of fresh whole milk is now being marked through introduction of handling and processing refinements by the Golden State Co., Ltd., of San Francisco, new entrant in the field.

Process and product have been given fully six years' of special research by the organization.

• The new canned milk, declares President J. R. Little, may soon be retailed in case lots at a price approximating that of fresh bottled milk. He cites minimized raw material handling, processing economies, and reduced distribution costs as the main factors in ranging this potential low price for the product.

• Two outstanding features are reported for the milk—long keeping quality and good flavor. It is stated that this product may be stored for as long as one year without refrigeration and with no impairment of quality. And in a quantitative appraisal*, the milk has been gaged as having but 5 percent of the cooked flavor found in canned evaporated milk.

Major economy of the process lies in the elimination of special handling equipment in transporting milk from farm to plant. Dr. A. P. Stewart, research director, points out that this new process utilizes cooled milk delivered to the plant in the conventional manner by tank-truck or in cans.

In contrast, the transportation method used by Med-O-Milk, Inc.,** the only other processor of canned whole milk, utilizes 200-300 gal. stainless steel tanks in which uncooled milk is held under constant vacuum until it enters the process.

Lower Costs Through Volume

Unhampered by problems that could arise from the use of these smaller tanks, the Golden State milk cannery will be able to receive and process unlimited quantities of milk, states Dr. Stewart, thus lowering costs through volume production. In addition, some savings will accrue through avoiding all outlays for such special tanks, their depreciation, and daily handling.

For conventional delivery to creameries, milk is refrigerated to a temperature below 50 deg. F. This cooling, says Dr. Stewart, removes "body-heat" from the milk, eliminating the hazard of the product retaining a "cowey" flavor. Also, since large quantities of milk can be received and blended for this process, there is more opportunity for achieving a uniform flavor in the finished product.

Currently, final patent rights have not been granted, so the company will not disclose all details of the process. However, a comparison with Med-O-Milk's process indicates that the main engineering differences concern unit operations preceding the Martin aseptic canning unit, that both processes use.

The pre-heater, homogenizer, HTST sterilizer, holding and cooling units used in Golden State's line are either entirely new types or are modifications of conventional units.

General information was disclosed: There are no special milking-parlors on the farms. And as stated earlier, instead of employing special stainless steel delivery tanks, milk arrives at Golden State's plant in the conventional manner.

By separation or blending, the butterfat content of the milk is standardized at 3.6 percent. Then, to make homogenization more efficient, it is heated to 112 deg. F. in a pre-heater. From the homogenizer, the milk moves at high velocity through the HTST sterilizer, where its temperature is raised to 300 deg. F. in 30 sec.

Pilot-Type Plant

It is kept at this temperature in the holding section for 2-3 sec., after which it is cooled. The cooled milk is then aseptically canned in the Martin unit.

Golden State's operation is a pilot-plant type of setup wherein the single aseptic canning unit employed constitutes the limiting production factor. Present output is thus restricted to 400-500 cases per 7-hr. day.

Rated capacities of the different Martin units are: 1-section, quart cans, 35/min.; 2-section, quart cans, 75/min.; and 3-section, quart cans, 135/min.

* "Determination of Heat-Produced Reducing Substances in Milk With Porphyrexide." A. P. Stewart, Jr., research director, Golden State. *Journal of Dairy Science*, 743-48, Aug. '51.

** See article, page 71, June '51 FE.

New Package a Cost Hurdle?

Here's a Carry-Home *That*

Midwest Bottler's Special Case-of-24 Cuts Material

LLOYD E. SLATER
Assistant Editor, "Food Engineering"

It's an old saying among food merchandisers that the best place to store your product is on the housewife's shelf.

To the soft drink bottler, this apt phrase has rapidly become a maxim. For a good measure of his volume depends on how well he convinces the housewife not to run out of his product. Hence, much of his time and ingenuity is devoted to merchandising technics that suggest bulk purchases to Mrs. Consumer.

Whatever the innovation—new carton, special wrap, different size—the costs involved may generally be expected to run a fair fraction of any resulting gain in sales. And adapting the change to plant routine frequently poses some irksome problems.

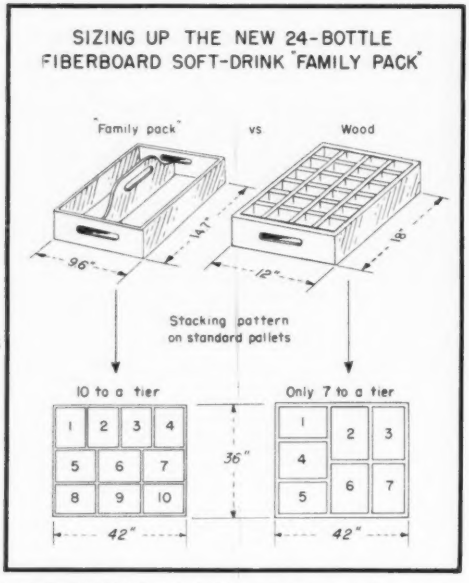
So consider the elation of the Seven-Up Iowa Co. when it hit upon a novel 24-bottle "Family Pack" that has not only proved to have great consumer appeal, but also in-plant benefits which, in themselves, have paid several times over for the switch from the time-honored wood case.

What's happened is that in replacing wood with new "take-home" kraft fiber carriers, the company finds it has—

- **trimmed 5 lb. from package weight with no practical loss in sturdiness.**
- **reduced initial package costs to about one-half that of wood units.**
- **added to plant and warehouse storage capacity by 21 more units per pallet.**
- **increased the carrying capacity of delivery trucks by 70 more cases.**
- **given the housewife a more compact, easy-to-handle bulk carrier.**

Basically, the new lightweight unit is a merchandising pack. J. B. Maher, Seven-Up Iowa's president, conceived it several years ago at a time when the six-bottle carton was commonly viewed as adequate. Why not, he reasoned, offer the housewife an easily-handled case-size carry-home unit?

Engineered fiber-carrier . . .



THE FIBERBOARD, 24-bottle carry-home carton is more compact than standard wooden type (note dimensions). It weighs almost 5 lb. less. Named "Family Pack" by Seven-Up Iowa, carrier is made from 90-to-100 point, 4-ply, laminated, bleached or unbleached kraft. Using loading layout shown, a pallet holds three more cartons per tier when loaded with new type.

. . . saves weight, space . . .

WORKER assembles new lightweight fiber carriers at bottling plant, using a steel stitching machine. Containers are received in space-saving, knocked-down condition. Initial packaging costs have been cut in half by using these new fiber cartons, since expense of construction material is much lower, shipping weights less, and storage space requirements practically nil.

Pays Its Own Way—Plus

Costs, Pays Handling Benefits, Zooms Truck Capacity

It took much time and experimentation to work out Maher's idea. But about three years ago, a paperboard carrier that seemed to embody all desired features was designed with the help of Gaylord Container Co., St. Louis. It was light—actually scaling 5 lb. less than its wood counterpart—and included a convenient carrying handle. And when loaded it was something even a schoolgirl could pick up and carry.

But most intriguing aspect of the new unit was its slimness—a mere 9 by 14 in., as opposed to the standard 12 by 18 in. wood case. This saving was due to its lack of wooden dividers and relatively thin walls. When 24 bottles were packed, they took up one-quarter less space than previously.

Handling Benefits

When the headquarters Des Moines plant started to handle the new "Family Pack", there was agreeable surprise at how well it adapted to the bottling line. The only change required was a special grid to permit the Standard-Knapp case packer to fit the smaller dimensions.

Making up a pallet load of "Family Packs" provided a first inkling of its in-plant benefits. First, it was found stackable to seven tiers—the same height as with the wooden units—without fear of damage. Then it was discovered that a standard 36 by 42 in. pallet held 21 more units—70 of kraft fiber as against 49 of wood.

Other bonanzas turned up in trucking: Less work was involved in loading and unloading deck trucks with the new, lighter pack. And a full load could be made five wide as contrasted with four previously—350 packs instead of 280.

The new carrier proved surprisingly rugged, too. When the project was launched, it was believed that paperboard would not stand the rigors of plant, truck, and store handling and that its turnover would be rapid. But many of the original units made three

(*Turn to page* 220)

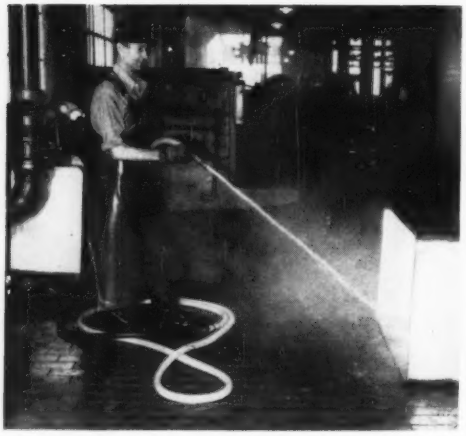
. . . ups the loads . . .

PALLET-LOAD of "Family-Packs" (right in top photo) holds 21 more units than regular load of "woodens" (left, top photo) with both stacked seven tiers high. Also, payloads of both older deck and newer pallet trucks (above) have been increased by 70 cases with use of durable, more compact 24-bottle paperboard carriers. Fork trucks speed loading.

. . . and proves durable

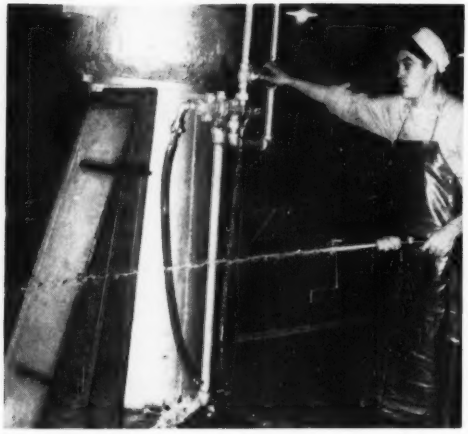
DISPLAYED next to standard six-bottle carton, "Family Packs" are quickly "catching on" in many grocery outlets. And they have proved more rugged than was expected—quite frequently making more than 50 round trips. Number of broken bottles and "popped" caps has been minimized by unit's adaptability to palletizing, which has cut manual handling to a bare minimum.

Portable that pointed the way



COMPANY first tried this portable jet (left). It is now used to clean mobile equipment in this special room.

Permanent rig that followed



NOW INSTALLED in all departments is this type permanent-mount jet cleaner. Company operates 25 units.

"*Pressure* Sanitizing Licked Our Dilemma"

Cleaning had to be stepped up—but there was less time for it. That was the poser when Morrell expanded its Ottumwa meat output. And here is how it was solved—

JOHN L. CARLSON and B. C. HENDRICKS

Process & Equipment and Packaging & Standardizing Engineers, respectively, John Morrell & Co., Ottumwa, Iowa

Faster, more efficient cleanups were what we needed at our Ottumwa, Iowa, plant of John Morrell & Co.—and to jump right to the crux of the story we got them by installing a system of strategically placed steam jet cleaners.

First, though, the factors behind the move: To stay ahead of shrinking returns per sales dollar, our facilities had to produce more than in the past. Men and machines had to operate with the very minimum of lost time and motion. And we could not afford costly shutdowns due to failure of process or product to meet the company's sanitary standards.

Further intensifying the picture was the challenge of the current bumper hog crop—already requiring our Ottumwa port departments to operate on a two-shift basis.

Thus, the situation had posed a sanitation dilemma: On the one hand, there was now much less time open for in-plant cleaning; on the other, there was an even more urgent need to maintain sanitary standards at highest levels.

Network Attack

To cope with what might well have become a runaway condition, we made our new attack on the problem—put in a network of 25 Sellers high-pressure jet cleaners to cover our various processing areas. Now used in a standard sanitizing routine, this hydraulic-pressure cleaning technic has paid four prime benefits:

1. Bacteria count on cutting boards and conveyors has been reduced to a new low.

2. Equipment and process lines are now sanitized without need for dismantling.

3. **Formerly inaccessible areas are now reached for fast, effective cleanup.**

4. And we are saving many precious man-hours for more productive use elsewhere.

Former cleaning methods at Ottumwa required large crews of men using brooms, brushes, detergents, and hot water. And while this costly, tedious method of sanitizing effectively met government regulations it usually fell short of the company's objectives in bacteria control.

An example would be the hard-maple cutting boards. These were cleaned by removal from tables, washing, and then steaming under pressure in retorts. But tests showed that even this drastic treatment did not cut bacteria to our desired low. In addition, this routine caused the boards to warp.

Portable Jet Tried

After several approaches to the problem of getting quicker and more effective cleaning, a portable high-pressure jet cleaner was brought in for

trial. First observations with this unit were made in the ham boning department. Here is an excerpt from the supervisor's test report—

. . . we made an examination for bacteria before and after regular cleanup. Spot exams were made in three different places—the cutting board (hard maple), the angle of the angle iron holding the cutting board, and the underneath side of the conveyor. Plates showed that regular cleanup did not destroy enough bacteria.

And then—

On the following day, the same exam was made after cleanup with the jet machine. Test results were very gratifying.

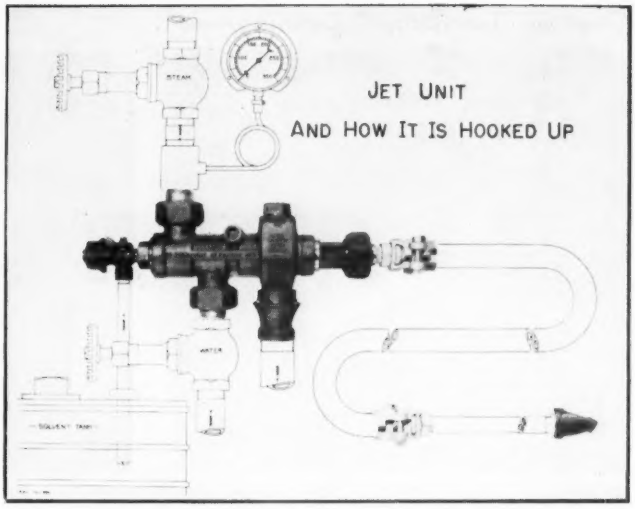
As a result of this performance in the ham boning and other test locations, 25 high-pressure jets were installed and a program involving their use set up.

All these jets—other than the initial portable unit—have been of the permanent wall-mounted type. They have a lower first cost and have proven ideally suited to our plant layout. Cleaning stations are spotted in central locations in various departments. Each unit has a 50 ft. hose that can be wielded in all directions.

Simple Construction

Actually, the jet cleaner is quite simple mechanically. The wall-mounted unit is a compact steel assembly—17 in. long and 3½ in. wide. It has 1-in-pipe inlet connections for steam and water and provision for a detergent siphoning hose attachment.

Internal makeup of the unit involves no moving parts. Primary components are three venturi tubes which inject steam and solvent into cold water. The effect of passing steam through the tapered, nozzle-like venturis is to greatly increase its velocity —almost tripling the working pressure of water as it emerges from the restricted hose end.



In operation, high pressure steam (90-125 psi.) injected into water in the mixing tube not only raises water temperature to a desired value (115-205 deg. F.) but also transfers energy to the water stream in the form of an equal pressure head (anywhere from 50-300 psi.) on the delivery line.

The high pressure in the water stream is the secret of the jet's effective cleaning action. It provides an hydraulic impact which loosens dirt that previously required much hand scrubbing to budge. In addition, the elevated water temperature softens up particles for this "hydraulic scrubbing" and destroys bacteria.

It should be pointed out that the sizable hydraulic pressure offers no danger to the attendant. It is produced by the restrictive effect of the hose nozzle. Thus, should the hose rupture along its length, water would simply pour from the system in a harmless manner.

Detergents or solvents are easily added to the jet system as a cleaning aid. Provided are a hose connection

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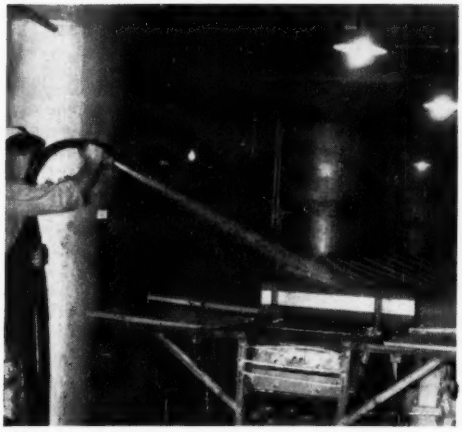
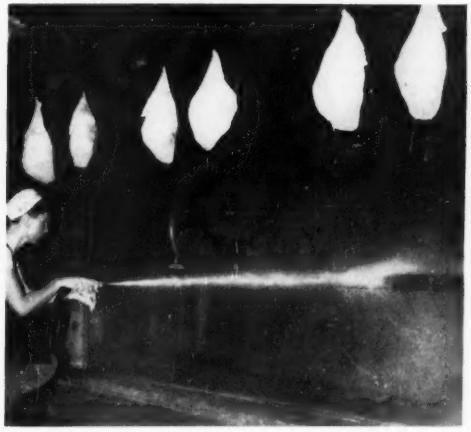
JET ACTION: At boning table . . . . . and in smokehouse

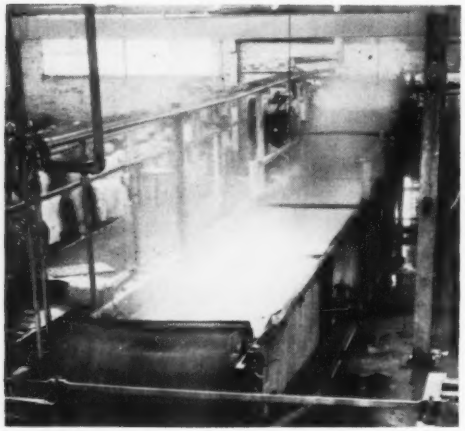


HERE, OPERATOR demonstrates how jet stream handily cleans ham boning table while its conveyor is running.

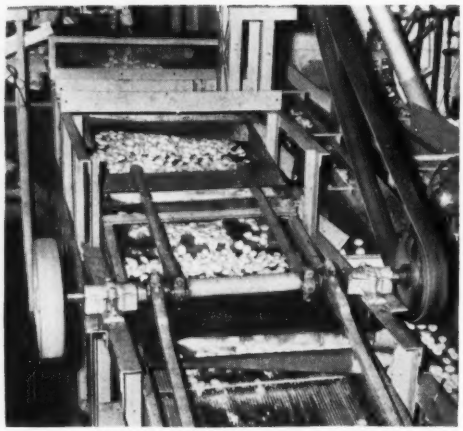


FROM ONE POSITION, operator cleans smokehouse. With units in motion, rails and hooks are cleaned as they pass.

Steps in "Low-Labor" Canning →



CAUSTIC BATH has capacity of 1,000 bu. per hr. It loosens peach skins for easy removal in spray washers.



VIBRATING SCREEN grades peeled peach halves into four sizes, routing each to a separate canning line.

Canning Costs *Fractionalized*

By Smart Teaming of Cooking, Cooling, Handling

Southern peach packer does it 1, 2, 3: Puts in automatic, continuous, processing units . . . integrates conveyor and fork-lift operations . . . and thus halves plant's labor needs

E. DALTON WHITE
"Food Engineering" Special Correspondent, Atlanta

Careful gaging of objectives—leading to installation of automatic equipment and streamlining of product movements—have paid off in a big way for Pomona Products Co. of Griffin, Ga., packer of Sunshine Brand canned peaches.

For the company's new processing units, plus latest materials handling devices, have fractionalized labor costs—cut them more than 50 percent as compared with the figures for the previous packing season.

And what's more, this saving has come at a time of acute labor shortages. It has released employees from manual handling tasks so they can be used in more productive positions.

Speedy Processing Guards Quality

Now for the story: Pomona's peach packing season opens about the second week in July, and by the first week in August the last can has been stored in the warehouse. The season begins smoothly with a steady flow of fruit, but becomes hectic during the middle two weeks when two shifts are working at top speed.

During these two weeks, when what seems like an endless stream of trucks bring fresh ripe fruit from the orchards, automatic equipment pays the biggest dividends. It is during this time that advanced planning shows to greatest advantage.

Pomona's most recent run—the '51 season—saw the advanced planning in full bloom. It showed up particularly in smooth operations of the new conveyor work-tables and the continuous cooker-cooler "that seemed to operate by itself."

It was apparent, also, in the better quality of the pack, as reflected by its greater uniformity, improved flavor, fragrance, firmness, and color.

Handsome Return From 3-Yr Plan

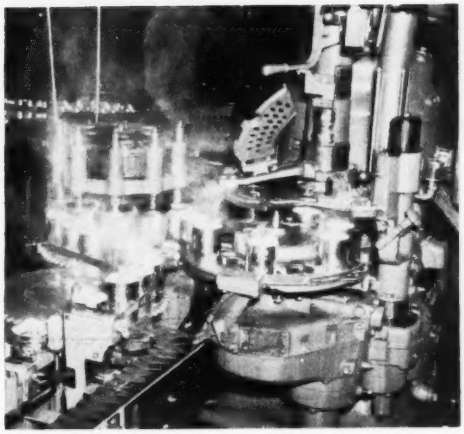
This season was the first since 1947 in which the company has canned peaches. In the intervening years, late freezes had practically wiped out the crop. The few peaches growers had picked found quick demand in the fresh fruit market. There were not sufficient left over to warrant canning.

But during these years the company had an opportunity to restudy its canning operations and formulate plans for increasing production and improving quality. Numerous changes were made in the plant, including conversion, wherever possible, from batch to automatic processing.

Planning reached as far back as the grower to obtain quality control in the orchard. Dr. H. L. Cochran, horticulturist for the company, gave growers expert advice in developing the best marketable crops. Controls were employed to prevent infestation, and to make for uniformity in size as well as improvement in texture of the fruit.

In '51, the winter was cold, the spring delightful—and a bountiful

FILLED CANS receive measured quantities of sugar syrup, then enter exhaust box and are heated to expel air.



IMMEDIATE SEALING follows discharge from exhaust box. Heating settles peach halves, prevents crushing.

crop was harvested. Picking and delivery were supervised by Pomona's own staff, and Federal fruit and vegetable inspectors checked and graded each load of peaches as it arrived at the receiving shed.

Operation Details

In the shed, peaches are dumped onto a grading conveyor and moved to the nearby packing plant. Receiving is scheduled so as to allow for continuous movement of fruit with a minimum of storage.

The belt conveyor system in the plant was designed to serve as a series of work benches in addition to being an automatic materials handling unit. Here, flexibility provides for any, or all, of the five production lines to be operated in accordance with supply of fruit. When in full operation, the system can handle approximately 600 bu. of fresh fruit per hour.

Largest Caustic Bath

In the packing plant, the flow is divided into five moving production lines for pitting and cleaning. These lines feed the caustic bath, believed to be the largest such tank in the South. Fabricated by Cox Foundry of Atlanta, it has a capacity of 1,000 bu. per hr. The peach halves, moving on a slat conveyor, remain in the bath from 1 to 2 min., the time depending upon the degree of ripeness.

From the caustic bath, halves are conveyed to two rotary spray washers and then to the vibrating screen, where they are graded into four sizes. Irregular and oversize halves are packed in No. 10 cans for the institutional and pie baking trade. Regular, uniform size halves are packed in No. 2½ cans.

Following packing, cans move to the automatic syrupers, then go through the exhaust box to sealer and cooker-cooler.

Peaches packed in 2½'s remain in the exhaust box until their temperatures are raised to 160 deg. F. Those in No. 10's are heated to 170-180 deg. in this machine.

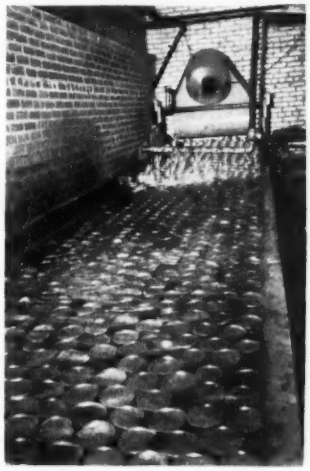
No effort is made to use this unit as a part of the cooker. It's primary function is to expel air bubbles from the can, and to allow peach halves to settle and thus prevent crushing during the sealing operation. This treatment also produces a more uniform color in the fruit.

Cooked and Cooled—90 Per Min.

Biggest advantage Pomona has gained in its packing operations is the boost resulting from installation of a new continuous cooker-cooler made by Dixie Way Can Machine Co., Lakeland, Fla. The Draper-type cooker section of this unit is 80 ft. long, and the cooler is 22 ft. long, with a water spray at the delivery end.

Cans of peaches remain in the continuous cooker for about 35 min. with water at approximately 211 deg. F. Time in the cooler is about 20 min. with water temperatures of 90 deg. at input end and 60 at the delivery end. Cans leave the cooler at about 100 deg. F. However, some further cooling is obtained as the cans are conveyed to the labeler.

Capacity of the cooker-cooler is about 90 cans per min. It is estimated that this rate is equal to that of ten retorts—and there is a great reduction in labor to boot.

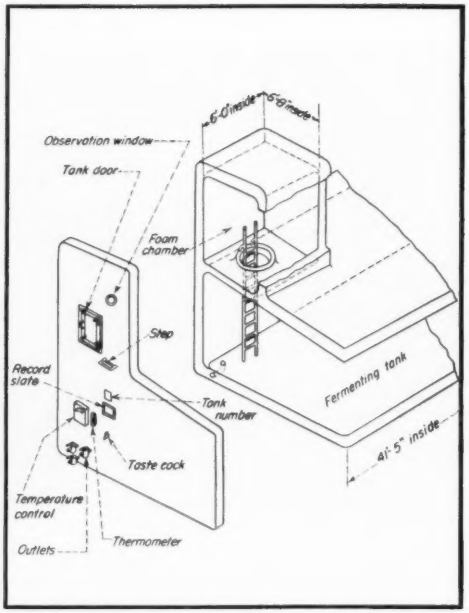


COOKER-COOLER DISCHARGE. Note sprays of cold water playing on cans as they are conveyed from tank.

True, peak production still calls for operation of retorts. But the greater portion of the pack is processed in the cooker-cooler.

Another time-and-cost saver is the integrated system employing conveyors and fork-lift trucks to handle 5,000 cases of canned peaches a day. Conveyors move the filled cans through labeling and boxing with a minimum of manual handling. Boxes are then palletized and move by fork-lift truck direct to railroad cars, truck-loading platform, or plant storage.

FERMENTING TANKS, behind tile walls, are ebon-lined concrete with automatically controlled attemperating coils.



TANK'S PATENTED construction features pitched ceiling. Foam rises into chamber, where "bitters" collect.

"DE-BITTERIZING" BEER

Product is made more palatable by St. Louis brewer's system of removing major portion of bitter coagulants from the fermenting wort. And the collection of valuable gas is facilitated . . . Key equipment is patented tank incorporating a special foam chamber

EDWARD H. VOGEL, JR.
Master Brewer, Griesedieck Bros. Brewing Co., St. Louis

In planning our new fermenting house—completed in 1950—at Griesedieck Bros. Brewing Co., St. Louis, we called for incorporation of a system to prevent the usual dispersal of the bitter residue in lager beer and also permit gas collection.

These two items, "scum"-removal and gas collection—the former a quality factor, the later economic—are extremely important in modern brewery operation.

Closed Process Advantageous

Brewers are employing more and more closed, pressure-tight fermenting-vessels. Some have made this change for space economy or to set up better control of the fermenting cycle. But the primary benefit to many is that a closed process provides for collection of carbon dioxide, which is an increasingly valuable byproduct.

However, an important advantage of the older method of open fermentation is that it allows removal of the bitter residue, or scum, which accumulates on the surface of wort during the process.

Studies of various attempts to do a combined job disclosed a special patented tank arrangement as most practical—a closed vessel with a pitched ceiling leading to a foam collecting chamber at its high end. Accordingly, through license arrangement with the patent holder (Anheuser-Busch, Inc.), special vessels with foam chambers were designed by Bosari Tank Co. and installed in our facility.

Conclusive data from early results with the new system revealed over 95 percent of bitter substances being removed during the course of fermentation. And resulting was a marked improvement in beer palatability which led us to "coin" the phrase "De-Bitterized".

How Scum Forms

Essentially, the bitter scum which accumulates on the surface of fermenting wort is a composite of proteins, hop resins, and tannins—all of which can contribute to a persistent bitterness and disagreeable astringent taste in beer. Its formation is due to the combination of a sizable drop in pH during the process plus the presence of many ascending CO_2 bubbles.

During fermentation, the transformation of sugar to alcohol and carbon dioxide by the action of yeast proceeds,

as is well known, according to this reaction scheme:

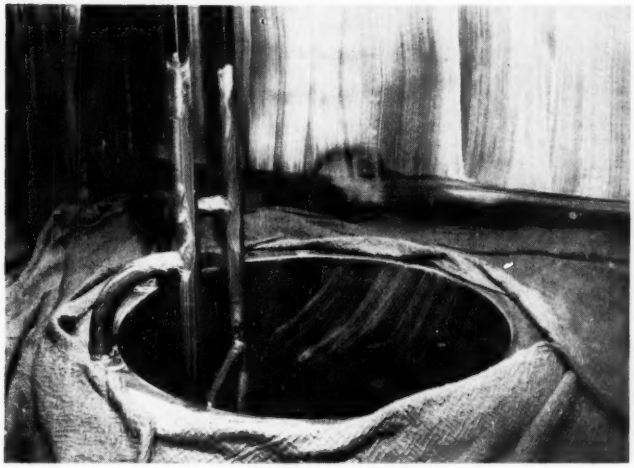
Glucose ($C_6H_{12}O_6$) becomes Alcohol (2 C_2H_5OH) plus carbon dioxide gas (2 CO_2)

Actually, the wort contains little glucose initially—mainly the disaccharides, maltose, and sucrose. But the enzyme sucrase, secreted by yeast, splits these to fermentable sugar. And another yeast enzyme, zymase, catalyzes the breakdown to alcohol and gas.

When a bubble of carbon dioxide is released during fermentation, a layer of adsorbed proteins and hop resins forms on the wort surface. As it rises through the wort, the bubble grows and its quantity of absorbed surface-active substances also increases. In this manner a sizable concentration of such substances gradually accumulates in the top layers of fermenting liquid.

As fermentation proceeds, its reaction grows more acid and approaches the iso-electric zone of several proteins from malt and yeast. In addition, the hop resins—weak acids themselves—also become less soluble. What results is a coagulation and precipitation of

Running Story of Separation



Chamber Prepared

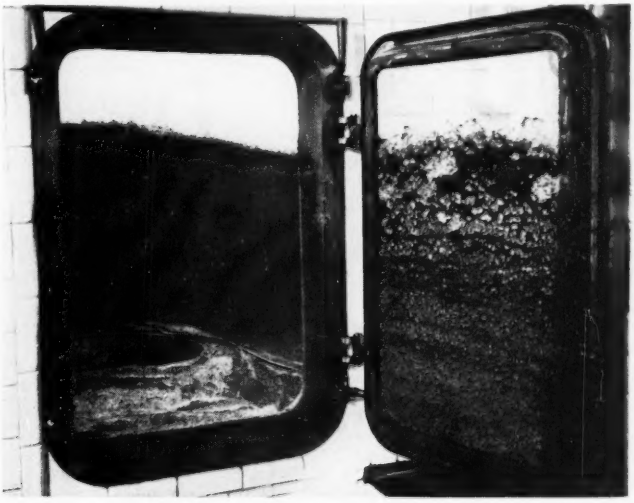
TO EASE "scum" removal, foam chamber is coated with inert clay. Sterilized filter cloth separates sediment from collapsing foam, with no loss of beer.

Foam Starts

IN LOW Krausen stage, white foam mounds build-up in bitter materials.

Peak Reached

IN HIGH Krausen stage, maximum collects. Here, author checks it.



And Here's Residue

AT END of 10-12 day fermenting cycle, foam breakdown occurs and leaves this bitter residue clinging to chamber walls and observation window.

these substances—primarily in the highly concentrated surface bubble layer and in the foam on top.

This phase in scum formation occurs during that stage of fermentation known as "low krausen" or "cauliflower" head, so named because of the characteristic compactly bunched white foam mounds that collect above the wort.

Gradually, the eliminated particles in the wort grow by adsorption and become coarse-disperse. And finally a layer of brown scum, sometimes called the "cover," is excreted in and above the foam. Its color is due to absorbed pigments.

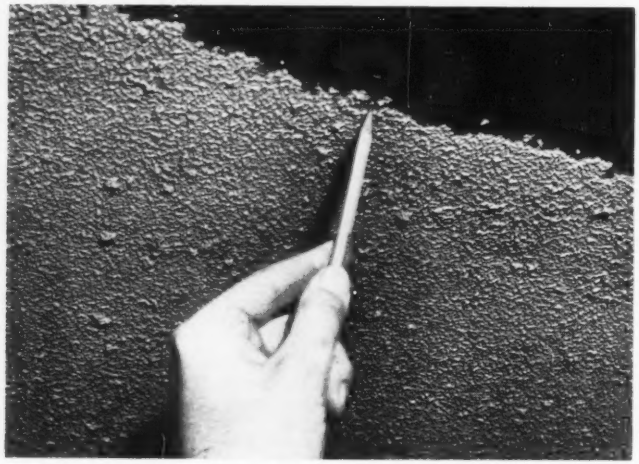
Formation of this bitter "cover" takes place during the third, "high krausen" stage of fermentation, when the foam has broken into loose brown-topped bunches. The heavy, dark colored formations should be removed at this point to prevent their redispersal into the beer when the foamhead collapses.

Fermentation in open vessels permits an easy removal of accumulated bitter material by a simple manual skimming. This is usually done when brown foam collects in the "low krausen" stage and when the dark scum appears in "high krausen". Also there is a final skimming after the foamhead breaks down at the end of fermentation.

Various attempts to eliminate this dark mass of resinous and protein material by mechanical means in gas-collecting closed vessels have been unsuccessful.

As a matter of fact, the only practical approach that our studies revealed was that advanced by the Anheuser-Busch patent, which has as its major claim a tank with its ceiling slanting upward into a foam chamber. Such a design affords a rise of foam *along* the ceiling and into its isolating chamber—with gummy substances adhering to ceiling and wall and having no chance to disperse. Then, when the foam filling the release chamber collapses it is filtered by gravity through a cloth, with practically no loss of beer.

Final Step: Removal



CLOSE-UP of partially washed ceiling shows how foam clings to surface.

INTERIOR of tanks are cleaned after "de-bitterizing" and fermenting cycle. About 250 lb. of material is removed from every 1,000 bbl. of beer.

The "De-Bitterizing" System

All Griesedieck beer is now "de-bitterized" in 45 closed fermenting vessels equipped with patented foam chambers. Each fermenter has a 1,045-bbl. capacity. Constructed of reinforced concrete with stainless steel fittings, these tanks are lined with "Ebon", a Swiss patented resinous material applied while hot as a $\frac{3}{8}$ in. coat.

During a fermentation cycle (lasting from 10 to 12 days), foam rises into the release chamber, and its various phases of change can be viewed through a window. In the chamber, bitter residue clings to both the coated walls and floor and even to the pane of the observation window. In addition, materials adhere to the ceiling and sides of the fermenting tank itself.

Finally, when the foamhead collapses at the end of fermentation it passes back into the tank through a ten-ply press-cloth filter having 9 by 9 openings per inch. This allows beer to drain through, while the remaining scum is caught.

In this manner, about 250 lb. of sediment are removed from every 1,000 bbl. of beer—about $\frac{1}{8}$ lb. of scum per barrel of beer fermented.

The sizable accumulation of sediment calls for a thorough cleaning job after each fermentation. Residue is completely removed with the aid of water and plenty of "elbow grease".

NEW PERFORMANCE is keynoted by speed. Here, milk is tested for sediment as cans are conveyed to dumping.

Case History Demonstrates

Four Big Modernization Benefits

1. *Greater* Capacity
2. *Smaller* Losses
3. *Reduced* Expenses
4. *Better* Concentrates

ARTHUR V. GEMMILL
Associate Editor, "Food Engineering"

Prime objectives were well defined —and attained—when Pioneer Ice Cream Div. of The Borden Co. modernized its Gouverneur, N. Y., milk processing plant in 1951.

First, was speeding the receipt of the large quantities of milk arriving daily from its 470 producers.

Second, was stepping up conversion of this milk (70,000,000 lb. annually) into high quality concentrates capable of withstanding prolonged cold storage without appreciable precipitation of solids and deterioration in flavor.

And not only was new capacity thus obtained—benefit (1)—but when the full score was added, (2) product losses were reduced, (3) operating economies were realized, and (4) quality of the manufactured concentrates was improved. The details will be brought out in this article.

How successfully receipts were accelerated may best be realized when one considers that each of the two receiving lines now handles an average of 14 cans of milk per minute.

What's more, the plant's concentrates (plastic cream and concentrated skim or whole milk) are today produced—

- **In greater volume with existing equipment.**
- **Having cold storage lives without deleterious precipitation.**
- **And with better flavors that are not influenced by seasonal changes.**

But it took a lot of advanced food plant engineering, and laboratory assistance, coupled with some new equipment, to accomplish the smooth running operations without making excessive changes in the 45-year-old plant.

"Island" Receiving Room

Initial step in the program was to increase the capacity of the receiving

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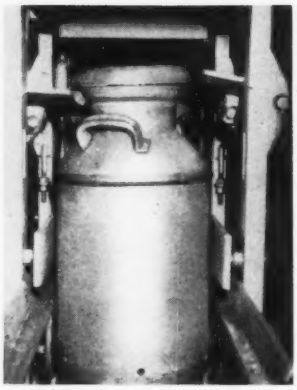
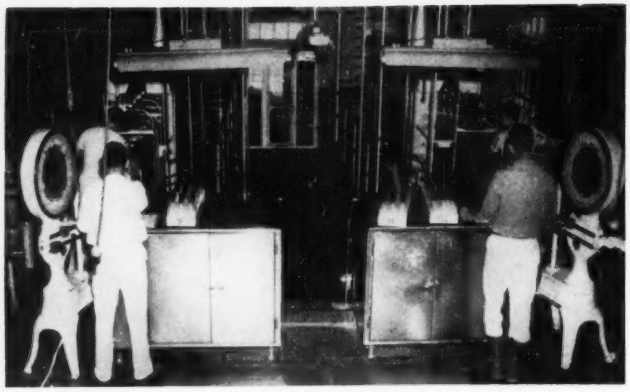
Borden's recent Gouverneur milk-plant revamp—cogently detailed in this article—clearly portrays the plan of action whereby a "satisfactory" production was skillfully shaped into a performance-plus operation . . . Practical foodmen who may still be hesitant about "taking the modernization step" will here find ample evidence that the dividends of streamlining outstrip the investment

How Raw Milk Is Received, Cooled, Stored →



ON ARRIVAL at plant, outside of can is washed and dried, then lid is loosened in pre-conditioning unit. Can then goes to dumping station.



PROPERLY LOCATED scale dials and automatic samplers enable one operator on each of the 14-can-per-min. can-receiving lines to take samples, record weights, and release milk from weigh tank. Other operator dumps cans continuously. Note stainless cabinets for composite samples.

room so that peak production (daily receipts in May and June average 330,000 lb.) could be handled without undue delays.

By installing an additional driveway, and a second handling line, two trucks were enabled to unload simultaneously. Now, the receiving room is on an island between two driveways, with individual receiving lines along each wall.

Unloading was also speeded when the empty can conveyors were extended 100 ft. beyond the discharge end of the can washers. Formerly, when a large truckload of milk was received, empty cans would back up into the receiving room and, unless they were removed manually from the conveyor and piled on the platform, dumping would stop until the truck moved down and picked up the empties. The extended conveyors now provide ample space for empty cans, regardless of the size of a load.

Inside the receiving room new units were installed to effect savings in labor and time, also to improve working conditions. One example of this multipurpose equipment is the Lathrop-Paulson can preconditioner (one in each line) that washes and dries the outside of the filled cans, then loosens the lids, making them ready for easy removal to facilitate inspection and dumping of the cans' contents.

By removing the surface dirt from the cans, the white uniforms—and *hands*—of the receiving room operators remain clean longer. Thus, there is less possibility of foreign matter falling into the weigh tanks and contaminating the milk. The lid lifters, by eliminating the need for manual loosening, allow more time for careful inspection of the milk before dumping.

Mojonnier automatic samplers take measured quantities of each producer's milk from the weigh tanks. These samplers enable one employee to drop a portion into a composite bottle, record the weight of the shipment, release the milk from the weigh tank into a balance tank, and swing the empty weigh tank into place for the next shipment as soon as the alternate weigh tank has been filled. At the same time, another operator on the line dumps the consecutive shipments as they are received.

As a further aid to the operator who samples the milk, stainless steel refrigerated cabinets were installed adjacent to the Toledo scales. These cabinets are of convenient working-table height and have several shelves for storing racks filled with composite sample bottles. Tops of the cabinets provide space for the automatic vacuum samplers, the weight tabulation sheets, and a few trays containing sample bottles (see right photo above).

Two Lathrop-Paulson straightline washers (16 cans per min.) receive the emptied cans and lids at the dumping station and, after cleaning, rinsing, steaming and drying, discharge the closed cans onto the rolling gravity conveyors.

Handling Raw Milk

Since it isn't possible to process the raw milk as speedily as it is received, provision was made for its immediate cooling and storing at 50 deg. F. Cooling is accomplished by pumping the milk from the two balance tanks through two parallel-connected York plate units, in which 48 deg. well water is the coolant, and then through a York direct-expansion ammonia cooler.

Two controls are available to take care of variations in receipt of the milk. First, the balance tanks are equipped with stainless steel Faratron level controls that start and stop the discharge pumps; second, four discharge pumps of varying capacities are provided, although only two are used at one time.

By using the smaller pumps when truck arrivals are spasmodic, practically a continuous flow of milk through the coolers is assured. This minimizes freeze-ups in the d.e. unit.

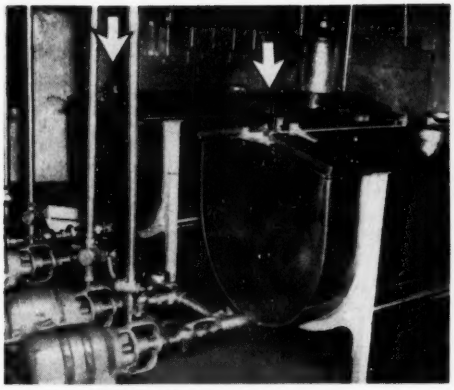
Processing Outlined

From storage in six 3,000-gal Pfaudler horizontal, ammonia-cooled, interconnected stainless steel tanks, the raw milk is automatically fed to a controlled balance tank, from which it is pumped to the processing room. This automatic control makes unnecessary constant attendance, yet assures a uniform supply of milk.

From the balance tank, the milk is pumped through a plate unit, in which it is heated to 120 deg. F. by regeneration against concentrated milk from the vacuum pans. Then it flows to a battery of four large (11,000 lb./hr.) De Laval separators.

Cream from these separators is pasteurized by heating to 175 deg. F. by regeneration against hot water in another plate unit, then it is cooled to 140 deg. F. and flows to the heavy (plastic) cream separator.

Due to the limited space in the processing room (containing 5 separators, 2 regenerative plate units, 1 Ste-Vac



THESE TWO BALANCE TANKS are fed milk from weigh tanks in receiving room. They are equipped with stainless steel Faratron level controls (arrows) that start and stop discharge pumps in foreground.

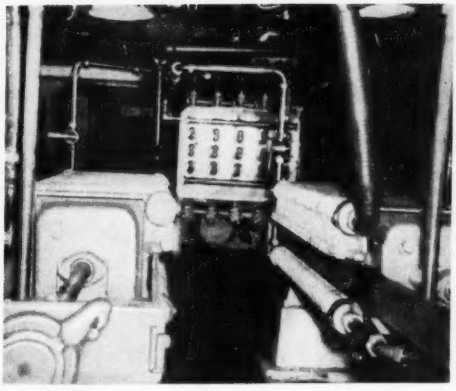


PLATE UNITS (foreground), using 48-deg. deepwell water as coolant, and direct expansion ammonia cooler (rear) chill raw milk to 50 deg. F. as it is pumped from the balance tanks to storage.

heater, and the 2 double-effect vacuum pans), the Votator used to cool the 80 percent cream was installed in a special filling room 80 ft. away. A Waukesha variable speed pump is used to move the plastic cream from the separator to the Votator.

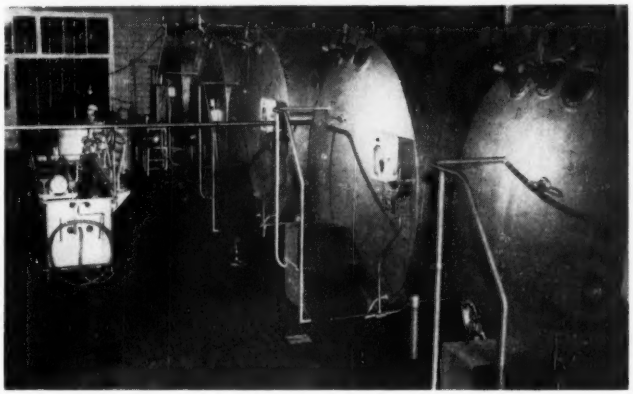
This pump actually does more than *originally anticipated*—for the separator operator can carefully adjust its speed to attain an ideal method of controlling the butterfat content of the cream (a normally difficult job).

Upon leaving the Votator, the plastic, at approximately 60 deg. F., is packaged in polyethylene-lined rectangular paperboard containers (50 lb. to the package). Correct weight is assured by filling on a conveyor section attached to a Toledo suspension scale. The polyethylene liner is then heat-sealed, the container closed, labeled, and conveyed to one of the four —10 deg. F. hardening rooms to await transportation to New York City or to cold storage.

The skim milk leaving the separators at 140 deg. F. (or whole milk from the regeneration unit at 120 deg., if whole concentrate is desired) is pumped through a Chester-Jensen Ste-Vac unit, in which a preheat temperature of 235 deg. is attained.

By carefully manipulating the pump that moves skim from the separators to the Ste-Vac, the efficiency of separators, with regard to loss of fat in the skim, has been greatly improved. And in the peak season, fat savings of as much as $100 per day are realized from this operation alone.

The preheated product flows directly from the Ste-Vac into two continuous, double-effect, stainless steel Buflovak vacuum pans. From the pans, the concentrated product is pumped through a plate unit, in which it is cooled to 33 deg. F., then flows to storage tanks to await transfer to tank trucks for final disposal.



STORAGE between receipt and processing is in six 3,000-gal., horizontal, ammonia-cooled stainless tanks. They are interconnected and discharge into an automatically controlled balance tank. On opposite side of this room are a row of similar tanks in which concentrated milk is stored.

Due to the high temperature of the product entering the pans, less heat is required to operate them at rated capacity. And with the normal amount of heat applied to the pan tubes, capacity of the pans is increased more than 20 percent. This increased capacity is particularly important in the peak season, since it reduces overtime operations and, therefore, labor costs.

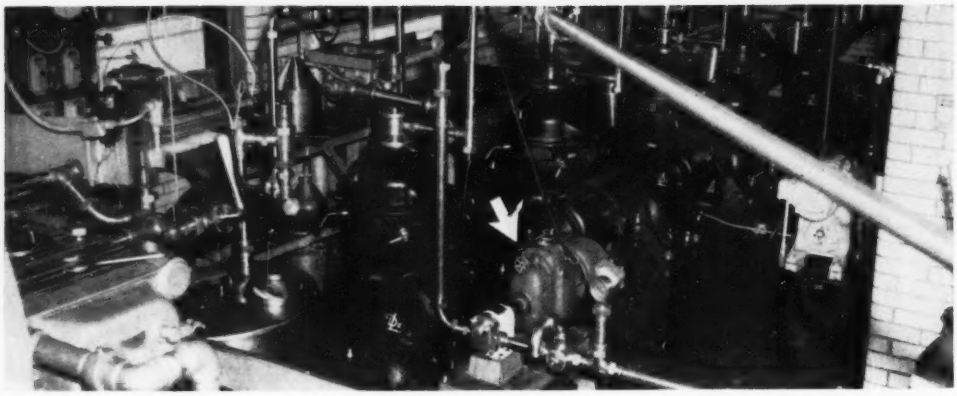
An unusual feature of the concentrating system—one that has a definite effect upon the quality of the resulting products—is the absence of hot wells or other types of holding equipment.

48-Deg. Well Water Saves $$$

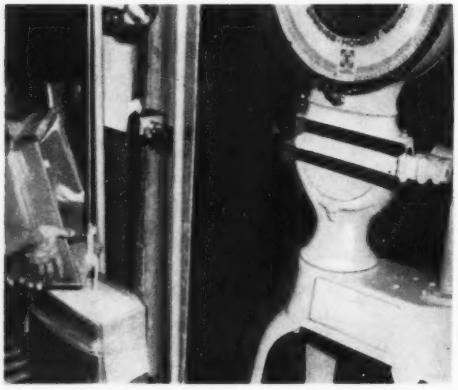
It has been estimated that the cooling job of the 48-deg. deepwell water employed throughout the plant is equivalent to 100 tons of ice machine capacity.

An example is the triple use of this water—first, in plate units to cool raw milk and concentrated skim or whole milk (water temperature rises from 48 to 65 deg. F. here); second, in the ammonia condensers (temperature rise here, 65 to 85 deg. F.); and third, in the barometric condensers of the two vacuum pans.

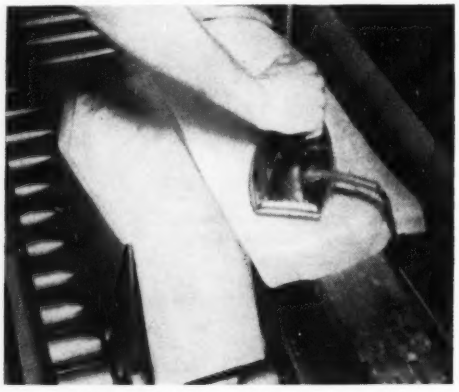
Converting to Concentrates



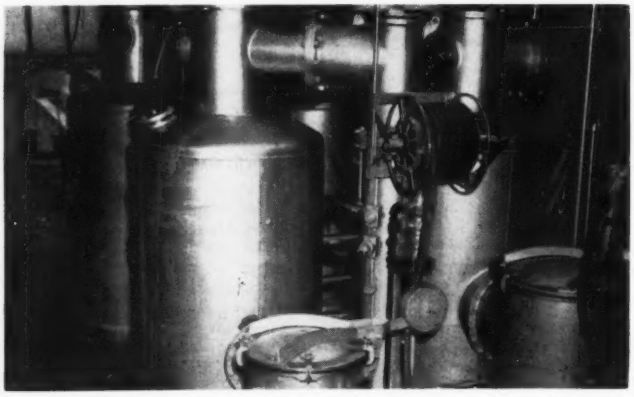
SEPARATION of cream from raw milk is first processing step. Here, four 11,000-lb.-per-hr. units produce 50 percent cream, which is pasteurized in plate unit (left) and converted to 80 percent "plastic" in separator (foreground). Variable speed pump (arrow) moves viscous plastic cream to filling room, 80 ft. away.



PLASTIC CREAM is chilled to 60 deg. F. in Votator, then filled in polyethylene-lined paperboard containers.



POLYETHYLENE LINING is heat-sealed, container is closed, labeled, and conveyed to —10 F. storage.



DOUBLE-EFFECT vacuum pans continuously concentrate skim or whole milk at rate of 33,000 lb. per hr. No hot wells or holding units are employed. Milk is preheated to 235 deg. F. as it is pumped from separators to pans.

Regeneration, too, is utilized wherever possible to cut product cooling costs. One example is its use in the plate unit that: (1) Heats raw milk to separating temperature (120 deg. F.), and (2) cools the 3.25-1 concentrate. To complete the concentrate cooling, well water and brine are employed.

Quality Control

The laboratory plays an important part in production of high quality concentrates at Gouverneur.

Each producer's milk is closely checked. Even very slight defects are revealed, and such information is transmitted, together with remedial recommendations, to an offender in time to be used before the next milking. Meritorious producers are rewarded with scrolls and take pride in keeping on the plant honor roll.

Inside the plant the laboratory has

used several tests in its efforts to improve the quality of the products manufactured. Most useful has been determination of the oxidation-reduction potential (Eh value). Thus it was found that hot wells or holding periods prior to concentrating were conducive to the development of off flavors and non-uniformity in finished products. This test also revealed the presence of metallic contamination and abusive handling detrimental to the products.

As a result of these findings, the concentrating systems have been made continuous and enclosed. Recommended temperatures here were those attainable routinely with the equipment available. Metallic contamination has been eliminated through use of all-stainless steel equipment, and abusive handling lessened as much as possible. Used are careful synchronization and coordination of processing, along with adjustable automatic thermostatic instruments that chart and closely control the desired temperatures during heating and cooling.

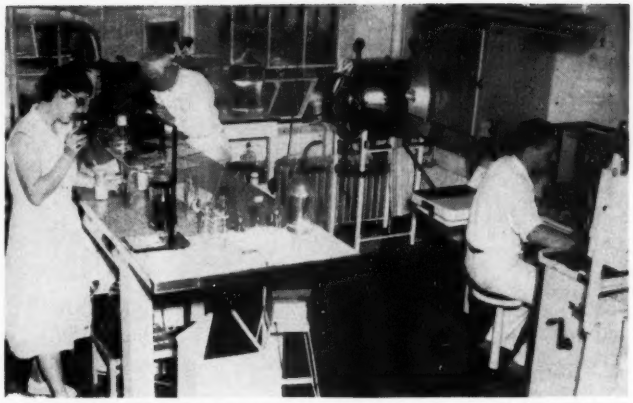
The laboratory also studied effects that portend and influence precipitation of some of the solid constituents in the skim or whole concentrates. It was discovered that—

1. High heat with short-time exposure was beneficial in preventing precipitations, or prolonging the time before they would occur. This also exerted a favorable influence upon the solubility of such precipitates.

2. Agitation of the finished product hastened formation of precipitates. This means cooling should be rapid and not in storage tanks where hours of agitation are necessary to produce a few degrees drop in temperature. Cooling coils in vats were also found to be offenders.

3. Trailer-truck tank shipments and ensuing storage in city tanks have an effect upon precipitation. Formerly, the 330-mile trip to New York meant that the product had to be made into ice cream within four days after manufacture. At present, due to improvements in the processing operations at

(*Turn to page* 214)



LABORATORY CONTROLS are exercised over both raw and finished products.

Launch Frozen-Meal Service On Rock Island RR Diners

Patrons afforded greater variety along with top quality—while big cut in food waste and significant man-hour savings are seen smoothing the "rugged economy" of operating the cars

MASS PREPARED pre-cooked and frozen meals—a comparatively new field for food engineering—is literally riding the rails past an important milestone.

For the Chicago, Rock Island & Pacific Railroad is currently supplanting the traditional kitchen operation on two of its crack trains with the new tailored meal feeding technic—a procedure it plans to extend within the year to all diners on the line's 8,000-mile trackage. All told, that will run to some 100,000 meals a month.

Much research and planning went into this drastic change. And the upshot was company confidence that its new streamlined service will score three ways:

Reduce diner food waste from 60 percent to virtually zero.

Allow true inventory accounting of all food purchased.

Trim the time and labor of in-car meal service to an economic low.

What's more, there is projected an increase in variety, quality, and eye-appeal of diner meals.

Dining service has long been a money-losing proposition for most roads, hence this move will be watched with keen interest. Several other roads, in fact, are known to be already exploring the general idea. The Chesapeake & Ohio, for one, has tried out frozen tray meals prepared by Frigidinner, Inc., of Philadelphia.

Rock Island, however, is going all out—is processing its own meals. It has set up a new plant in South Chicago where top diner chefs—trained in the technic—are launching the new mass cooking and baking. To get large scale efficiency, the plan calls for only one menu item to be processed during a single day. This permits purchases of fresh food when the market or crop is ideal.

New Technics in Freezing, Thawing

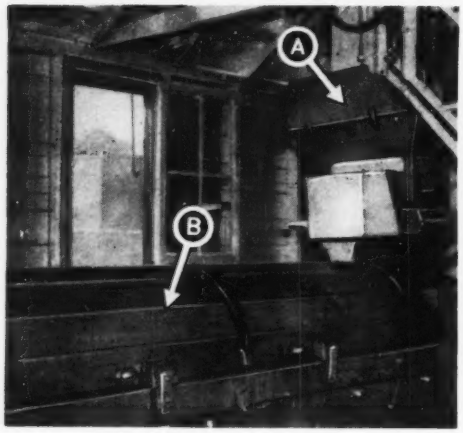
To develop varied, palate-provoking menus, a good deal of original research was done by the company and frozen food consultants. New schedules to freeze various cooked items were worked out, and equally individual schedules for thawing and heating were also devised.

A clue to the thawing technics is provided by the design of the special stainless steel warming oven which will soon be in all diners. Heated by bottled propane gas and having deflecting louvers for circulating its heat, this unit is provided with three distinct temperature zones—each thermostatically controlled—which will allow thawing of each item according to a definite temperature sequence.

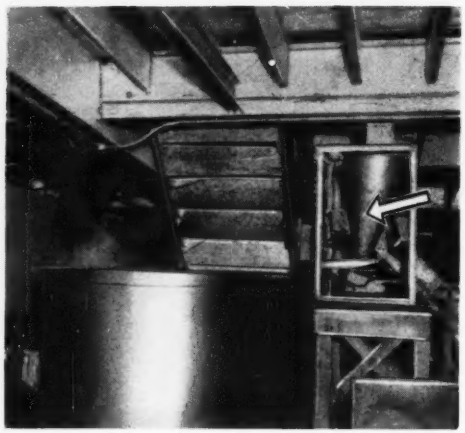
Pre-cooked food for each menu is frozen individually in fairly compact aluminum containers designed for the

(*Turn to page* 151)

Grapes Are Crushed, Stemmed, and Mixed With Filter Aid . . .



1 **WASHED GRAPES** are crushed (A) and chuted to stemmer (B) that handles 10 tons an hour.



2 **VIBRATING FEEDER** (arrow) introduces filter aid in stainless tank containing 140-deg. F. grape pulp.

They Make *Better* Grape Juice

By Low-Temperature Concentrating and Freezing

Seneca company processors effectively employ falling-film type evaporator to continuously concentrate de-tartrated juice under vacuum. And after blending and canning, they quick-freeze it

JOHN V. ZIEMBA
Assistant Editor, "Food Engineering"

Taking a practical tip from technics in the citrus-juice industry, Seneca Grape Juice Corp. of Dundee, N. Y., has recently adopted a highly efficient, low temperature evaporator for making top-quality frozen concentrated grape juice.

By using this advanced processing technic, concord grape juice is now being preserved in its near-natural condition.

Four additional measures taken to safeguard the quality of the juice during processing are:

A. Careful washing of the grapes prior to crushing and stemming.

B. Employment of stainless steel equipment all along the line.

C. Three-step screening to separate seeds and skins from the juice before it is pasteurized.

D. Chilling the juice to settle out the tartrates.

How the grape juice is high-vacuum, low temperature concentrated, then frozen under close supervision of technicians of the Minute-Maid Corp., the contracting company, will be related below.

Crushing and Stemming

During the season, approximately 2,400 tons of field-run concord grapes are received in 40-lb. lug boxes. Initially, they are inspected, weighed, and dumped into a 15-in. by 15-ft. rectangular wooden rinsing tank containing 110-deg. F. well water. Grapes now go on to a perforated-bucket elevator, are there washed by a series of water sprays, and are carried up to a rotary crusher. Here, two fluted, counter-rotating brass rolls crush the grapes.

Crushed grapes are then chuted to the stemmer, where the grape pulp is separated from the stems in a horizontal, stainless steel drum with ¾-in. openings. A series of rapidly turning paddles, spirally arranged on a central shaft, whisks the stems out of the end of the drum. At the same time, the paddles force the grape pulp through the drum openings into a stainless steel hopper. Capacity of the stemmer is 10 tons of grapes per hour.

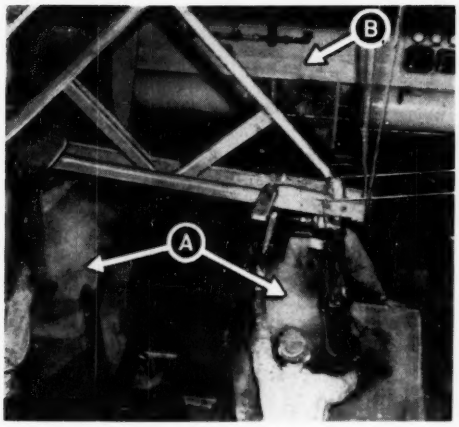
Extracting the red color from the grapes and preparing them for pressing are the next steps. From the crusher sump, the crushed grapes are pumped to a twin-bank heating unit. The bottom bank is used for heating the pulp to extract color, while the top bank is employed to pasteurize the juice coming from the hydraulic presses.

In the color-extraction process, pulp is pumped through a series of 2-in. dia. stainless steel steam-jacketed tubes. Temperature of the pulp leaving the bottom-bank heater is 140 deg. F.

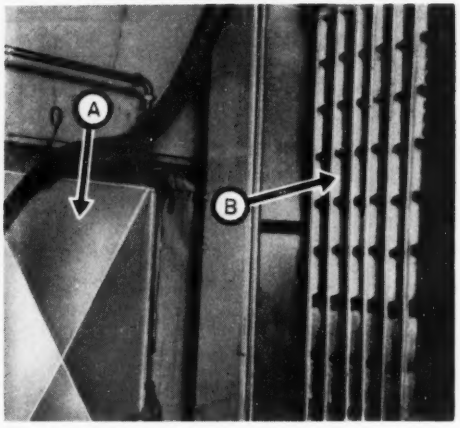
Pressing the Pulp

Heated pulp is now prepared for pressing. It is pumped into a 500-gal. stainless steel tank that is equipped with a propeller-type agitator. As the hot pulp is agitated, ½ percent of filter aid is introduced to facilitate subsequent pressing of the juice. And to assure continuous flow of filter aid,

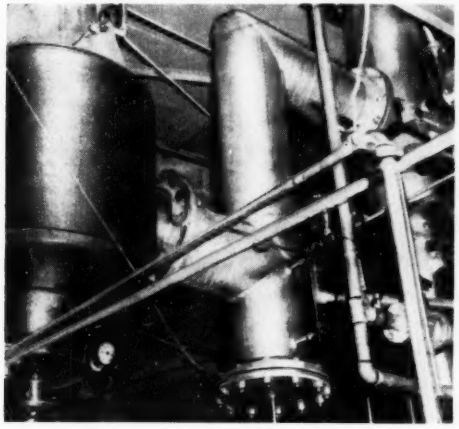
. . . Then Pressed Into Juice That Is Processed in Evaporator



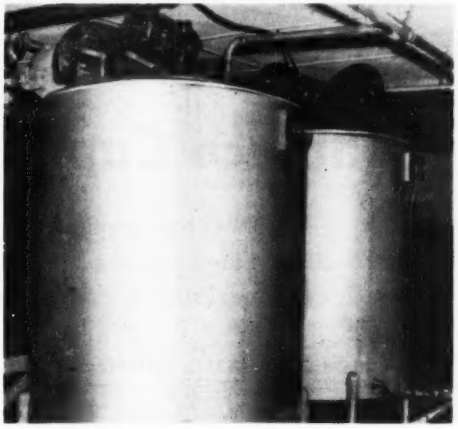
3 **CHEESES** are prepared at stations (A) prior to pressing. Heater (B) extracts color and pasteurizes juice.



4 **PASTEURIZED** juice goes to prechiller (A) and cabinet-type cooler (B). Tartrates then settle out.



5 **JUICE** is concentrated to 50 deg. Brix in this low-temperature, falling-film type, multi-tube evaporator.



6 **AFTER** concentrate is diluted with fresh juice and sugar, it is chilled in these tanks, canned, and frozen.

a Syntron vibrating feeder is employed. Both the supply hopper and delivery chute of the feeder are equipped with vibrating units.

Now to pressing the juice: The pulp and filter aid slurry is gravity-fed through a 3-in. dia. stainless steel pipe with twin outlets. These two feeds are directly above two cheese-building stations. Each outlet has a lever-operated slide valve.

In preparing the cheeses, an aluminum form is first set over a 45x45-in. rack and a press cloth is placed over both so that the margins are the same on all sides. Hot pulp is then added until the form is filled. And after the pulp is leveled and the margins of the press cloth are folded, the form is removed. Then a wooden rack is placed on top of the cloth containing the grape pulp.

This procedure is repeated until the capacity of the hydraulic press is reached—that is, until 15 of the cheeses holding ¾ tons of pulp are formed.

Each press rack is equipped with four flanged wheels mounted on two rails for movement from cheese-building to the first and second pressing stations. In the first press, a 2,400-lb. weight on top of the cheeses gradually presses juice from the pulp. After 10-15 min. of pressing, the rack is then rolled under the hydraulic press, where a pressure of 2,500 psi. is applied.

Juice from both presses is discharged into stainless steel troughs. Mounted over these troughs are fine-mesh screens that separate any seeds and skins from the juice. From the troughs, juice is next piped into a 700-gal. stainless steel, rectangular holding tank. The latter has six 40-mesh vertical screens that remove any remaining pulp.

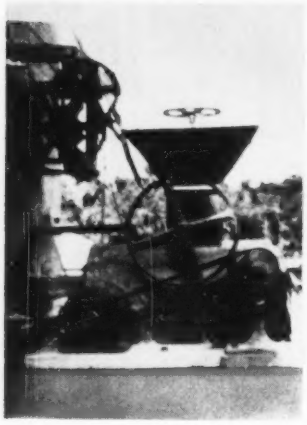
From the holding tank, the juice is pumped through the top bank of the tubular heating unit, where it is pasteurized for 30 sec. at 180 deg. F.

Removing Tartrates

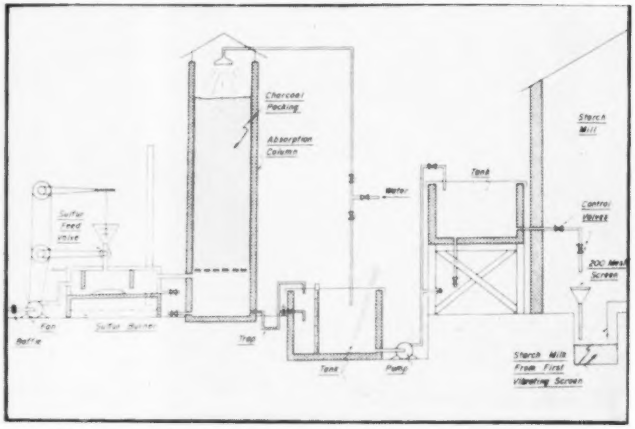
Precipitation of the tartrates from the juice follows. The juice is pumped to a precooler. Here, the 180-deg. F. juice is rapidly chilled to 100 deg. F. as it cascades over a series of horizontal, stainless steel 2½-in. pipes with well water running through them. A

(*Turn to page* 153)

Key Role Is Played by This Sulfur Dioxide Generator



CAST IRON BURNER, with motor driven feed valve, converts ground sulfur into sulfur dioxide.



INSTALLATION DIAGRAMMED. Gas from burner (left) enters absorption tower, where it is dissolved in water and flows into tank (center). Here, it is standardized and pumped to storage tanks that supply starch mill.

GF-Brazil Plan Wins

Tapioca *Capacity and Quality*

High flow of top-specification flour has been engineered in process that features clearing of starch tables every 12 hr., addition of sulfur dioxide to "milk," and employment of continuous centrifuges

G. VAN BIEMA and LEE C. SHIPMAN
General Foods Corp. Central Laboratories, Hoboken, N. J., and Minute Tapioca Plant, Orange, Mass., respectively

A number of very notable achievements in the tapioca field can now be credited to the program of cooperation between General Foods Corp. technologists and Brazilian producers.

Launched in 1947, the new plan of action has chalked up the following advances:

1. Improved plant design and raised capacity through employment of up-to-date equipment and methods.

2. Recovered 15 percent more total measurable starch from the tapioca roots.

3. Bettered quality to such an extent that by 1950 more than 95 percent of the cooperating plants' flour (as the product is known to the trade) met the rigid Minute Tapioca specifications.

4. Developed distinct "quality consciousness" on the part of the Brazilian producers.

Mustered against the various problems encountered was a special series of quality yardsticks for the guidance of the producers. Covered were mesh size, uniformity, odor, moisture content, ash content, color, contamination, pH, viscosities, and SO_2 content. (Editor's note: These have been previously detailed for our readers in the article "This 10-Test Plan Clinched Tapioca Quality," p. 49, Apr. 1950 *Food Industries.*)

Off-color had been a particular problem. In the Brazilian factories, the greatest single cause of this trouble was use of iron or plain steel equipment in contact with wet or moist starch. Hydrocyanic acid liberated by the tapioca roots reacted with the iron, frequently producing a severe gray or bluish discoloration. Galvanized iron piping also constituted a potential source of color contamination when the zinc wore off after several years' use.

Overall View of the Line

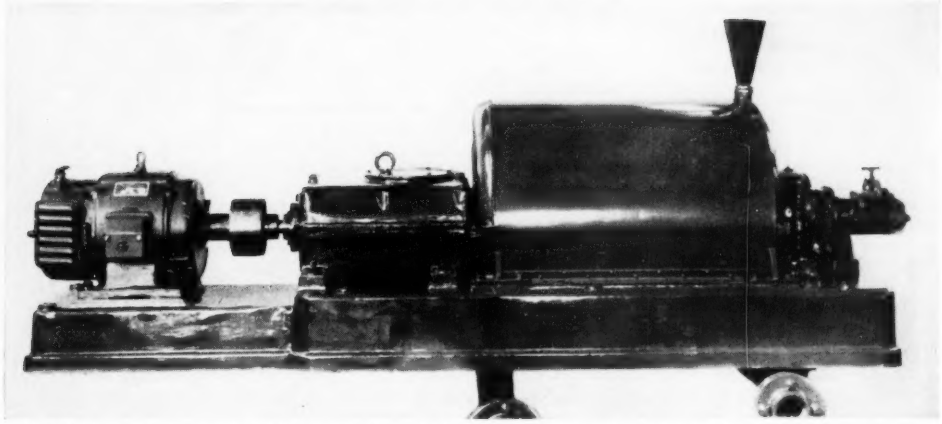
—will be found in this month's special FE foldout Flowsheet, "Making Top-Grade Tapioca Flour." In graphic color and replete with keyed photos, it's presented on pages 132-135.

Facilities Modernized

Now, with the new use of brass, bronze, aluminum and stainless steel over the last several seasons, the old color bogey is seen banished. Experience with rubber tubing, although of shorter duration, has been satisfactory so far, too.

Power failures and low voltages were responsible for much lost output in a number of plants (approximately 200 hp. are needed for a plant processing 50 metric tons of roots per 24-hr. day). Furthermore, roots and wet starch ferment during shutdowns at prevailing processing temperatures (64 deg. F.) with a definite reduction in quality. Diesel-electric generators,

Continuous Centrifuging Speeds Starch Recovery



BRAZILIAN COPY of German "Uhland" centrifuge quickly separates fruit-water from starch and cellulose. Then starch is re-slurried and fed to tables. In some plants, tables have been eliminated by feeding "milk" to the centrifuge at 5 to 10 percent above its capacity, and using a second machine for washing the starch.

installed as auxiliary power sources, have minimized these difficulties.

None of the cooperating plants used SO_2 prior to 1949. By 1950, two installations were in operation, and others were contemplated. A solution containing 0.2 percent SO_2 by weight is added to the starch "milk" (at a rate of 1 liter for each 2 kg. of dry starch) before the final wet screening, or immediately prior to tabling. Vacuum-dried flour thus treated rarely contains more than 20 ppm. SO_2.

Concentration of the solution is adjusted by controlling burner and column conditions and, when necessary, by adding water in one of the tanks. Concentrations are determined by a method involving the addition of 0.1 N iodine-potassium iodide solution, followed by back-titration with 0.1 N sodium thiosulfate.

Betters Product 3-Ways

Among the benefits resulting from *effectively controlled* SO_2 treatment are:

1. Bettered color of the flour due to bleaching.
2. Sped settling on the tables and in washing tanks—reducing starch losses in liquors leaving the plant and resulting in better cellulose-starch separation.
3. Prevented fermentation—with odor of product improved, starch losses due to fermentation eliminated, sanitary conditions bettered, and effects of power failures on product quality reduced.

To produce the SO_2 solution, the following units were installed:

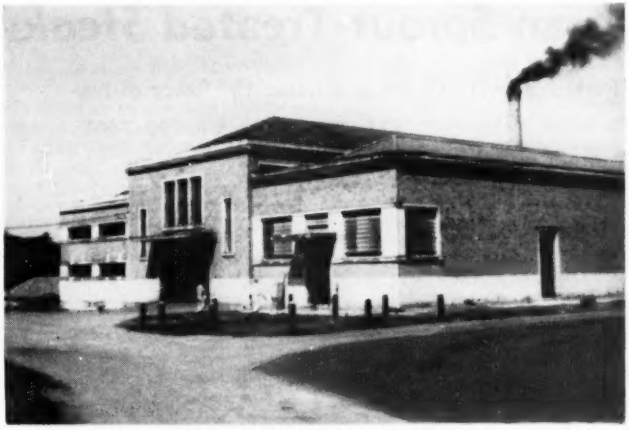
A. *Sulfur burner.* A water-jacketed cast iron burner with motor-driven feed valve for the ground sulfur is used. The sulfur is burned in a removable copper pan. Air is furnished by a blower and a duct with adjustable baffle.

B. *Absorption column.* These units have been variously constructed—of ordinary brick and lined with acid-resisting brick, or of wood joined without nails. Actual installations are about 18 ft. high with an open cross sectional area 20 x 20 in. A heavy wooden grill supports a packing of wood charcoal in chunks varying in sizes from 2 to 5 in. Gases enter through a glazed ceramic pipe. Water is sprayed on the packing from a bronze or aluminum shower head.

The above installation is adequate for a plant grinding 100 metric tons of roots per day. An 80 percent yield, based on sulfur burned, can be obtained. The resulting solution has a concentration of 0.1 to 0.3 percent SO_2 by weight.

C. *Miscellaneous equipment.* Wooden tanks joined without nails were found suitable for this service. Employed were pumps, piping and fittings of aluminum, bronze or a suitable stainless steel.

It was seen that brass and copper



THIS PLANT, on the Santa Cruz plantation in the state of Sao Paulo, is typical of modern Brazilian facilities for producing tapioca flour.

corroded too quickly. Lead piping should not be used when producing starch for food purposes. Neither the SO_2 solution nor the starch slurry treated with it should come in contact with iron or plain carbon steel.

Step-by-Step Operations

Individual unit operations were studied and the following changes made to improve their efficiencies:

In the first grinding step, finer grinding and better starch extraction were obtained in the rasps when the customary retaining screens (with 5 mm. x 14 mm. slots) were replaced with screens having circular holes of 3.5 mm. dia. The grinder requires a 25 hp., 1,250 rpm. motor to process 50 tons of roots per day.

In the second grinding step, improved starch liberation was obtained by changing the retaining screens having slots 3 x 10 mm. to ones having 1 mm. dia. perforations. Additional improvement resulted when the rasp units were converted into hammer mills. This was done by installing new rotors, each carrying about 100 hammers, arranged in banks of 5. Each hammer has a sharp cutting edge in the direction of rotation to help disintegrate the fibrous roots. Motor required: 20-30 hp., 1,700 rpm.

Much additional starch is recovered from the pulp mass following grinding by passing it through a third brush-washer before discharging. By employing counter-current flow, the total amount of water used is not increased. Result of the change has been reduction in starch losses in the waste pulp from about 4.5 lb. to approximately 1.9 lb. per pound of fibrous matter. Further improvements seem possible here.

A single set of reciprocating 100-120 mesh screens, operating at 200-300 cycles per min., was formerly employed for wet screening of the starch. By two successive screenings, through 120 and 200 mesh screens, respectively, a much cleaner flour is produced. Here, phosphor-bronze screens are giving good service. They are durable, easily cleaned and repaired, and do not contaminate the product. Nylon screens plugged rapidly and were difficult to clean.

Several plants now use a Brazilian-built centrifuge similar in design to the German "Uhland" machine. Oper-

(*Turn to page* 182)

PUT UP IN 6-oz. packets, new meat item makes debut in Weingarten's supermarkets, Houston. Wrap is protective wax paper bag, red lettered.

Bean Sprout-Treated *Steaks*

Persha injects extract to enhance the flavor of his product and enrich it at low cost . . . Ground meat in ball form is added offering in special frozen line

IT MAY BE like "carrying coals to Newcastle", but here's a new food product that's designed to improve on the flavor and nutritive value of fresh beef.

"Steakees," first commercial offering of newly formed Steakees, Inc., of Houston, Tex., are made from fresh frozen beef cutlets that have been injected—by a special process—with an extract of fresh Ming bean sprouts. The process is the culmination of five years of experimentation by David Persha, originator of domestic Ming bean sprout culture in Duluth, Minn.

Persha, in searches to broaden the use of bean sprouts, discovered that an extract of the product acted as an actual flavor enhancer in many foods. Further, analysis by the U. S. Department of Agriculture revealed that the ingredient was exceptionally high in minerals (iron, calcium, and phosphorus) and also in vitamin C, thiamin, and riboflavin.

With this double virtue and a rather low extract cost—about 20c. per pound—the bean sprout ingredient appeared a "natural" for use as an inexpensive "enriching and enhancing" agent. And no product displayed more feasibility for its benefits than fresh beef.

How Product Is Prepared

In processing the new product, fat and lean of steak-cut beef are first separated and the fat refined, following which purified fat is returned to the meat. Then the bean sprout extract is injected—up to about 6 lb. for every 100 lb. of meat—under carefully maintained temperature conditions. Absorption of both fat and extract by the meat apparently is vitally dependent on an exact temperature and blending time.

After extract injection, the meat is held for 48 hr. to effect a "cure". Stuffing into casing, freezing, and slicing follow, with final packaging of the product in red-printed white wax paper bags each holding 6 oz.

Persha's introduction of this new item has been primarily in food markets in the Houston and San Antonio areas. However, increasing demand has led to a search for larger processing facilities, and future multi-state distribution is envisioned.

Aim of Persha, after his innovation is broadly founded, is to concentrate on manufacture of the extract while franchising his process to meat packers in various localities.

Recently, a companion product known as "Beefees" was also introduced. This is a bean-sprout treated ground beef frozen in ball form for short-order cookery. Beefees are currently being supplied to selected restaurants, with Persha exercising strict control to prevent dilution or trimming of the basic ¼-lb. ball, which he holds to a fixed consumer price of 25c.

GUARDING yogurt's custard-like body is makers' big problem. Breakstone solves it by this careful packaging.

Factors In the Rise of

Yogurt and Other Cultured Milks

Though there may be question as to their having curative values, the stimulating pleasing flavors of these products have brought about a steady increase in use

C. B. LANE
Director of Research,
Breakstone Bros., Inc., Walton, N. Y.

Diet-conscious Americans are largely responsible for the recent popularity and increased production of cultured milks, particularly buttermilk and yogurt. And present demand probably exceeds that of the mid-'20's when consumers became enthused about the purported therapeutic value of acidolphilus and bulgarian milks.

Popularity of the latter milks has dwindled during the past 25 years, while cultured buttermilk and yogurt have enjoyed increasing favor. The explanation is simple: The former are very sour tasting and rather unpalatable, whereas the latter have body and flavor characteristics which meet the enthusiastic approval of many people.

Until recently, the quantity of yogurt manufactured commercially in this country was very small. Several companies enjoyed a limited yet dependable business. There were no difficulties in meeting market demands.

But immediately after publication of Dr. Hauser's best seller, *Look Younger, Live Longer*, and its condensation in *Readers Digest*, the requests for this product jumped to remarkable heights.

Soon, numerous articles pertaining to the product were published in trade journals, newspapers, and popular magazines. It was obvious that hundreds of yogurt "experts" had developed practically over-night, and some of the formulations they advised would have created serious production problems had they been followed.

The call for yogurt has now leveled somewhat, since many of the converts have found that the food falls short of being a youth-regaining panacea. But thousands have apparently developed the yogurt taste. It is evident that many now buy it as a food rather than as a health treatment.

Not Easy to Make

It must be realized that many problems are involved in the commercial manufacture of yogurt. To make a product acceptable to the large markets, absolute control of raw materials, time factors, and temperatures is necessary. In addition, trained personnel, suitable equipment, and the art of successful propagation of culture bacteria must be developed.

The satisfactory cultures contain a

Lactobacillus, probably composed of *L. bulgaricus* and a strain of *S. thermophilus*. Apparently, each type stimulates the other, since they grow more rapidly together and bring about more extensive changes in milk than when grown separately.

The cultures grow very rapidly at 100 to 120 deg. F. At these temperatures they will produce 1 percent lactic acid within a few hours, and 2 percent or more after several hours.

Commercial yogurt is generally prepared from milk that has been highly heat-treated (180 deg. F. for 30 min.) and homogenized. Some manufacturers prefer whole milk of normal solids content, while others fortify the milk with condensed or powder for the purpose of obtaining additional body in the finished product. Still others condense the milk in a vacuum pan, removing up to one-third of the water.

A product containing added solids may have an advantage from the standpoint of additional body, but the disadvantage of an undesirable cooked flavor and the difficulty of controlling acid development should not be overlooked.

In its manufacture, the heat-treated milk is cooled to a suitable inoculating temperature (100 to 120 deg. F.) and culture is added. At this point some makers fill the warm product into glass or paper retail containers and place these in an incubator for ripening of the product. Others ripen it in cans and then package. In either case, the inoculated milk must be held at warm temperatures, until the desired body and acidity are reached, then chilled rapidly with refrigeration.

Typical yogurt ripened in retail packages has a smooth, glassy, shiny surface with very little, if any, moisture separation. The body is custard-like and smooth; the flavor clean and stimulatingly acid. To maintain this condition after several handlings and after rail or truck transportation represents one of the greatest problems. Our own company specially packs the product for safe delivery (see photo).

For persons who dislike the acid flavor, the product is sometimes made with added fruit preserves. And some consumers prefer such flavoring materials as cinnamon, sugar, honey, and syrup.

Yogurt has also found favor as a dressing for salads, a garnish for meats and vegetables, and as a condiment adding flavorful zest to other foods. Real lovers of it, however, consume the product directly from the container with a spoon.

Other Products

An additional variety of cultured milk that has achieved a place in the American diet is the aforesaid cultured buttermilk. Then there is also the acidophilus milk.

Conventional buttermilk and cultured buttermilk represent two different and distinct products. In a strict sense, the former is the liquid portion obtained after the fat is accumulated in the process of buttermaking, whereas cultured buttermilk is whole, partially skimmed, or skim milk which has been fermented with a specific bacterial culture.

Due to its stimulating, pleasing flavor and the fact that many believe in its health-giving properties, demand for cultured buttermilk has steadily increased since its inception over 30 yr. ago.

In its preparation, fermentation is carried out with cultures used in buttermaking, so that the product itself is essentialy a butter culture. *S. lactis*, the predominating organism, is associated with *S. citrovorus* and *S. paracitrovorus*, which have the ability to ferment citric acid into various neutral compounds, including diacetyl, acetylmethylcarbinol, and 2,3-butylene glycol.

Diacetyl is largely responsible for the pleasing aroma of this beverage as well as of other dairy products made with butter culture, such as soft, unripened cheeses, sour cream, and butter itself.

Cultured buttermilk is prepared in various ways. Here is a general procedure for making the product with visible butter granules:

Skim milk is heat-treated to 185 deg. F. for 1 hr., after which it is cooled rapidly to 72 deg. F. At this point, 0.5 to 3.0 percent butterfat is added in the form of 20 percent freshly pasteurized cream. Butter culture is then added at the rate of 1.5 percent and the mixture is held about 16 hr. at 72 degrees F., or until the acidity reaches 0.8 percent calculated as lactic acid.

The ripened milk is transferred to a churn, where salt may be added at the rate of ½ oz. per 10 gal. If highly colored butter granules are desired, a small amount of butter color is also added. Churning is completed at high speed for about 10 min. at 72 deg. F., then the mixture is transferred to a coil vat and cooled to 40 deg. F. or lower. Packaging follows.

When a product without butter granules is desired, the churning procedure is eliminated, and the desired quantity of cream is added after ripening, rather than before.

Acidolphilus Milk

Rettger and his associates at Yale University were successful (1920-1923) in implanting *L. acidolphilus* in the intestines of animals as well as man and demonstrating its therapeutic application in certain intestinal disorders, such as constipation, chronic diarrhea, colitis.

Following publication of their results, acidolphilus milk, and also other acidolphilus preparations in the form of tablets, capsules, and liquids, were offered by various commercial concerns. And many persons consumed these products in volume in the hope that all sorts of ailments would be alleviated.

Apparently, the indiscriminate use,

(*Turn to page* 161)

Present Thinking On the Health Aspect

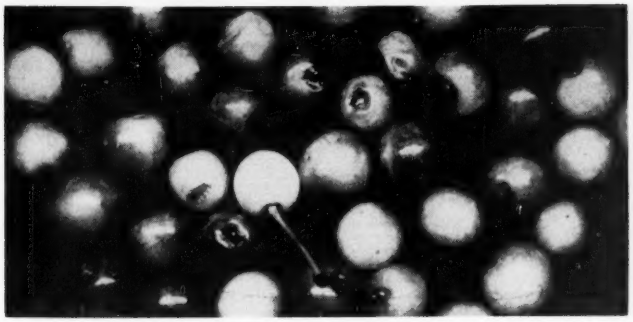
Bacteriologically, cultured milks are included in a general group termed "fermented milks." They contain relatively large amounts of lactic acid, and some also have substantial quantities of ethyl alcohol. Consequently, they have good keeping quality, are free from viable pathogenic organisms, and may have a variety of flavors and textures.

Practically all of these milks contain coccus forms of bacteria which are probably *Streptococcus lactis* or *S. thermophilus*. All contain rod forms which are probably *Lactobacillus acidolphilus* or *L. bulgaricus*, and some contain yeasts of the Saccharomyces and Torula types.

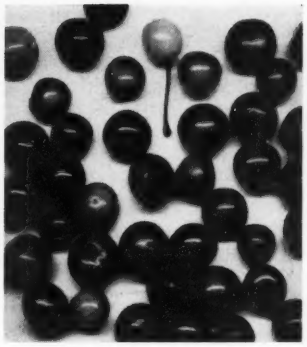
Widespread interest in their use in intestinal therapy was stimulated through the writings of Elie Metchnikoff, particularly his book, *The Prolongation of Life*, published in 1908. Metchnikoff and his supporters believed that many human ills were to be blamed on harmful putrefactive bacteria in the intestines. By changing the intestinal flora through ingestion of large quantities of fermented milk containing both lactic acid and the organisms producing it, a longer, healthier life was thought to result.

While, in general, the benefits of certain fermented milks have been confirmed, many of Metchnikoff's conclusions have not been accepted by others who have studied the subject. It is generally conceded that there is little experimental data supporting therapeutic values of *L. bulgaricus*.

On the other hand, the literature on *L. acidolphilus* is sufficiently sound to show that this organism can easily be recovered (thus implying its beneficial action) from the gastro-intestinal tract.



PINK LIGHT, DARK BACKGROUND that proved best. In test work with cherries, it brought out greatest contrast between sound and unsound fruit—the good cherries appearing light. Sorters found this illumination pleasant, both on day and night shifts.



PINK AGAINST WHITE. Here, light background made spotting of culls more difficult. In further research, inspection belts colored cherry-red were indicated as best background.

Culling-Under-Color Technic Zooms Grading Performance

Contrasts between good and bad cherries are highly accentuated when fruit is suffused by different-hued fluorescent lighting. Cite 64 percent improvement in sorting

EFFICIENCY in grading and sorting cherries can be decidedly augmented, it is now indicated, by a special technic wherein colored lights are employed to illuminate the inspection tables.

In fact, promise is shown of almost doubling each worker's ability to spot culls, judging by the results of experiments conducted by the Michigan State College's Department of Agricultural Engineering.

In trials run at the laboratories and in 13 processing plants, both blue and red fluorescent lights were tested against the standard white fluorescents. Whereas the reds proved unsatisfactory because of their extremely low intensity—only 6 percent of white at a given wattage—the blues saw a rise from 10 to 30 percent in the efficiency of the workers.

And when pink tubes with light-red filters were substituted for the reds—giving 50 percent the intensity of whites—culling performance jumped to an average 64 percent over that with whites.

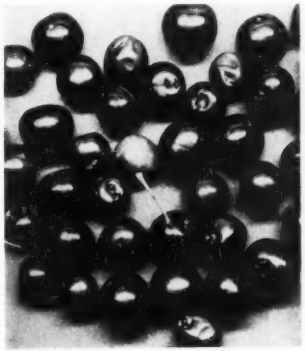
The shade of background presented by the inspection table surface was also indicated as important, and changes here are seen raising the culling scores even higher. For small color differences between similarly hued objects can best be detected if the objects are viewed against a color simulating that of the average of the objects being inspected.

Either rubberized belts incorporating the red color or red-backed transparent plastic conveyors may be the answer here. The plastic belt would have the desired color fastened to the underside with a waterproof adhesive.

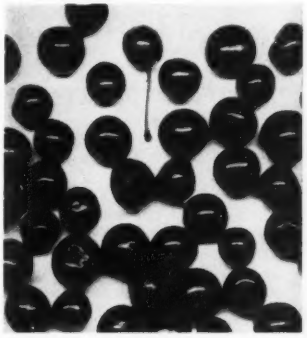
The tests were very carefully conducted—each running for 2 hr. The researchers took samples (100 cherries) just before and immediately after the inspection step, and culled them. Then the weights of the culls removed before and after were tabulated and compared to determine the "sorting efficiency" under the various fluorescents.

Workers were rotated during the test periods to compensate for any human differences.

This feature is a brief of the article, "Possibilities of Using Colored Lights for Detection of Cull Cherries," by G. M. Peterson and W. M. Carleton, published in the November 1951 Quarterly Bulletin *of the Michigan Agricultural Experiment Station, Michigan State College, East Lansing.*

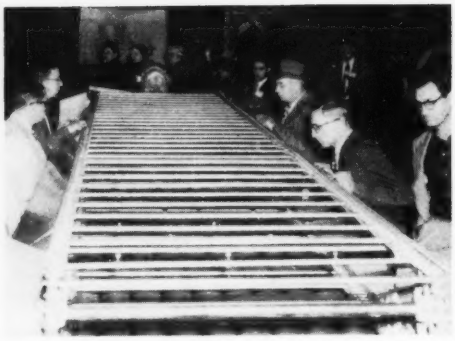


BLUE AGAINST DARK also upped performance of sorters in detecting defects, though not as notably as the pink. Workers objected to dark color imparted to cherries, especially in daytime.



CONVENTIONAL WHITE, commonly used at cherry-inspection tables, is shown by this photo to offer very little contrast between good and bad fruit. Here, culling efficiency is low—and eye fatigue high.

VACUUM sealing with lug caps at 80-200/min. speed is now possible using this Cemseal unit, states demonstrator, Crown Cork & Seal Co., Baltimore, Md. (62A)



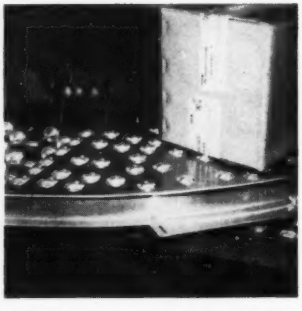
SPINNER cooler in which partially submerged revolving cans pass under 20 spray pipes was shown by Chisholm-Ryder Co., Inc., Niagara Falls, N. Y. (62B)

Latest Canning Equipment

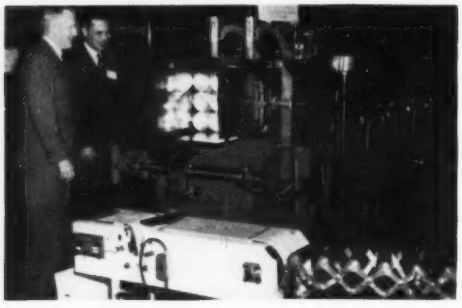
In Focus At Atlantic City

CORRUGATED boxes with processed edges that increase strength of flap scores were displayed by Shelton Mfg. Co., Inc., Newark, N. J. (62C)

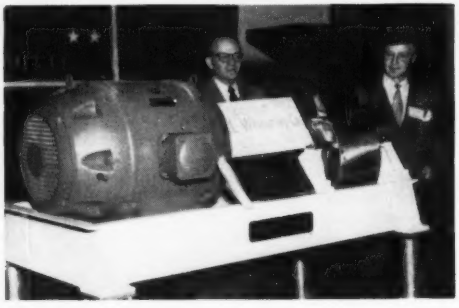
SIMPLICITY of assembly and disassembly of extra-gage stainless sanitary pumps was shown by Tri-Clover Machine Co., Kenosha, Wis. (62D)



PACKAGES are easily diverted from any point on gravity conveyor by portable unit of The Rapids-Standard Co., Inc., Grand Rapids, Mich. (62E)

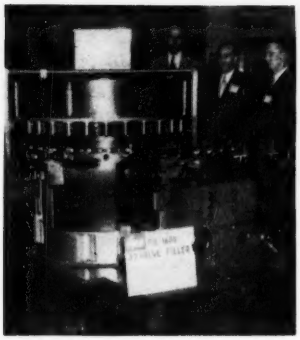


GENTLE handling of cans from high speed lines gets accent in this automatic caser exhibited by Food Machinery & Chemical Corp., Hoopeston, Ill. (62F)

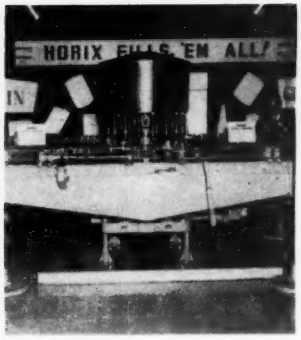


SMOOTHER pulp and greater yield from tomatoes and pumpkins are claimed for this 30-hp. comminuter made by The W. J. Fitzpatrick Co., Chicago. (62G)

Filing, Closing, Casing

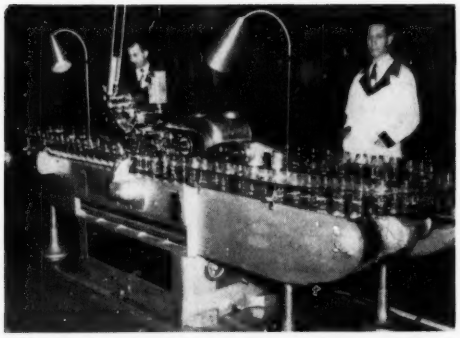


ACCURACY and high capacity (400/min.) are notable features of 30-valve filler displayed by Food Machinery & Chemical Corp., Hoopeston, Ill. (63A)

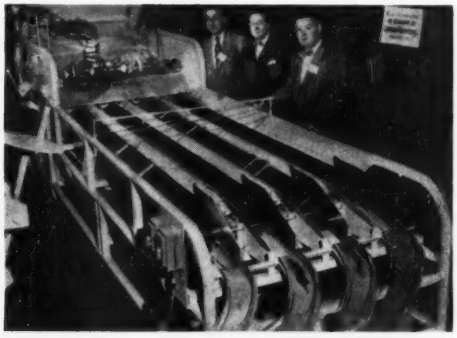


BRINER, exhibited by Horix Mfg. Co., Pittsburgh, operates without displacement disks. Valves have threaded height adjustment for clean, accurate fill without overflow. (63B)

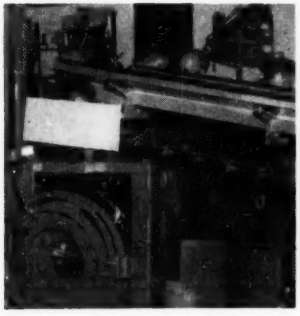
FLOOR space is saved by compact semi-automatic case sealer that comes in three sizes, and can be made portable if desired. Maker: A-B-C Packaging Machine Corp., Quincy, Ill. (63C)



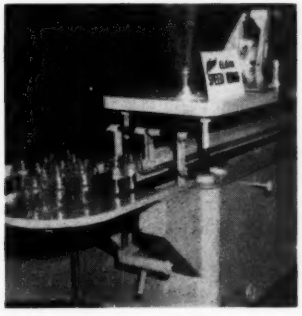
AUTOMATIC steam-vacuum sealing of glass food jars at speeds of 75-250/min. is stated possible with this Steriseal machine shown by Anchor Hocking Glass Corp., Lancaster, Ohio. (63D)



ROUGH unscrambling is eliminated by new filing mechanism in unit displayed by Dudley Machinery Corp., Mountain View, Calif. Gentle "roll-off" delivers up to 750 cans/min. (63E)



LOOSE-CUT products are pressed into cans without damage by this filler employing chain-mounted cups. Maker: Chisholm-Ryder Co., Inc., Niagara Falls, N. Y. (63F)



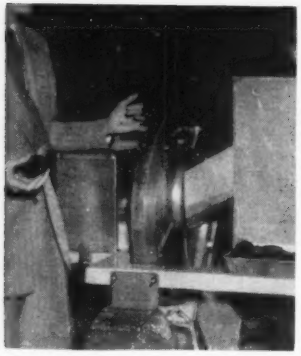
HIGH-SPEED (18-126/min.) 2-valve straight-line unit for liquids or semi-liquids features accurate fill on continuous conveyor. Maker: Elgin Mfg. Co., Elgin, Ill. (63G)

THREE size cans (300, 303, 307) are handled by this adjustable case packer made by Burt Machine Co., Baltimore, Md. Unit packs single or double tiers. Size changes are quickly made. (63H)

Want more information about any items in this picture article? Just circle key number (in parenthesis at end of each caption) on the Reader Service coupon adjacent to the inside back cover

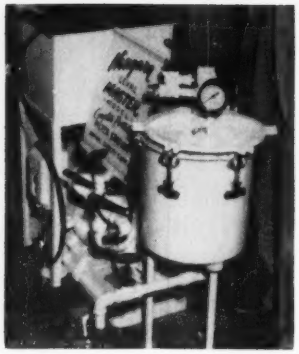
Turn Page for More New Units →

Processing, Handling, Protecting

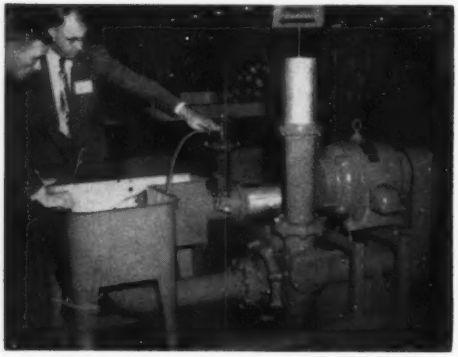


UNIFORM slices result from special arrangement of stationary knives and spiral feed in beet slicer exhibited by Urschel Laboratories, Inc., Valparaiso, Ind. (64A)

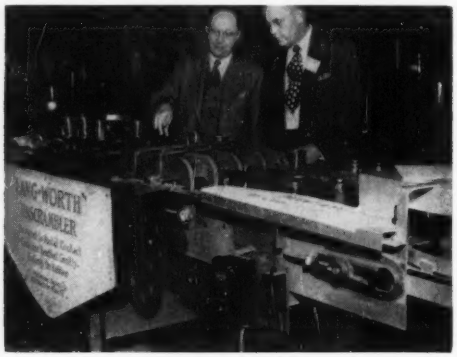
SANITARY features such as rounded edges and corrosion resistance are highlights of this large aluminum kettle offered by The Aluminum Utensil Co., New Kensington, Pa. (64B)



REVOLUTIONARY new filter uses synthetic porous stone as support for loose filter-aids. Maker: Niagara Filter Corp., Buffalo. Unit mounted on ball-bearing casters. (64C)

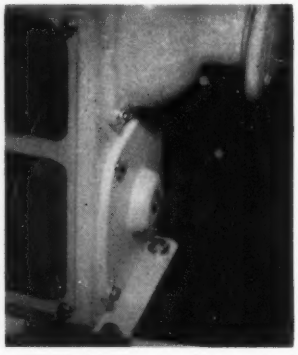


NEW 5-in. hydraulic elevator, exhibited by Scott-Viner Co., Columbus, Ohio, employs Fairbanks-Morse vaneless centrifugal pump for suspended solids. Driven by 7½ hp. Master motor. (64D)

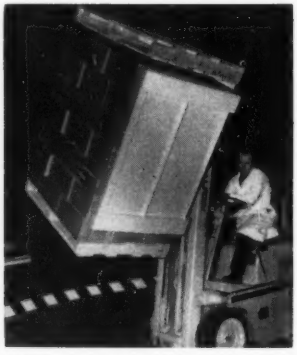


COMPACT, mobile unscrambler in which cans are handled entirely on rubber, thus eliminating denting and scratching, was shown by F. H. Langsenkamp Co., Indianapolis, Ind. Takes sizes to No. 3's at 600/min. (64E)

TRAMP iron is removed from dry foods and sausage by two units—a magnetic plate and a trap—made by Columbia Engineering Service Co., San Francisco. (64F)

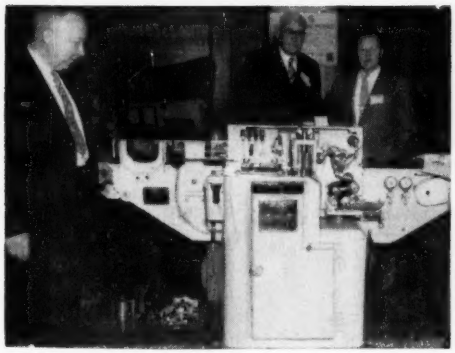


VARIABLE speed drives in fractional horsepower sizes giving ratios up to 10:1 were shown by Reeves Pulley Co., Columbus, Ind. Operating parts totally enclosed. (64G)

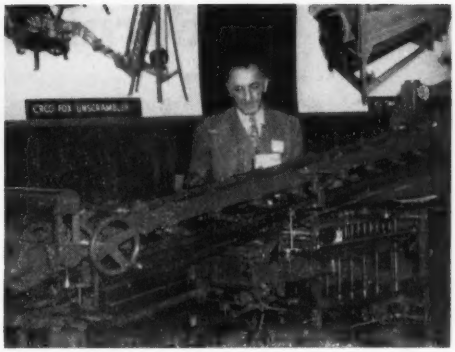


CASE rotating device mounted on new 1½-ton battery-powered fork truck was demonstrated by Clark Equipment Co., Battle Creek, Mich. Unit employs totally-enclosed drive motor. (64H)

Labelers for Tin or Glass

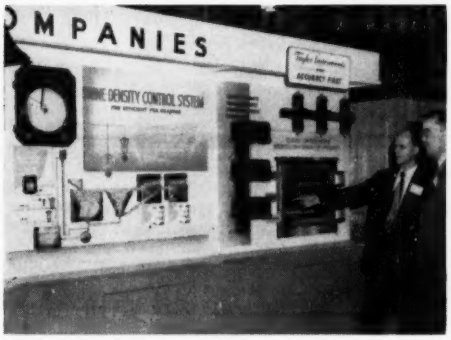


VARIOUS sizes and shapes of glass containers can be labeled at 2,400-10,000/hr. by this Banks unit shown by Stokes & Smith Co., Philadelphia. (65A)

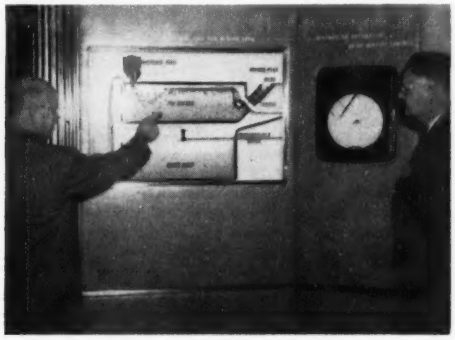


WRAP-AROUND labeler handles 500 cans or jars per min. in sizes from 2⅛ in. dia. x 2 in. high. Maker: Chisholm-Ryder Co., Inc., Niagara Falls, N. Y. (65B)

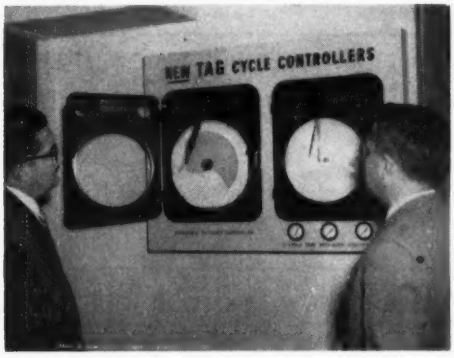
Automatic Process Controllers



BRINE-DENSITY control systems for flotation pea graders were shown diagrammatically by two companies: Left, Taylor Instruments Co's., Rochester, N. Y.; right, Foxboro Co., Foxboro, Mass. Both systems use pneumatic valves to admit brine and water as required. New Transaire control was also featured by Taylor. (65C and 65D)



CONTROLLER with plastic process-cycle cam having chart printed on it was exhibited by Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia. New linear flowmeter was also shown. (65E)



PNEUMATIC controller with time regulator, and one with plastic cam, were featured by Tagliabue Div., Weston Electrical Instrument Corp., Newark, N. J. One operates on elapsed-time; other on time-cycle. (65F)

Big Modernization Expenditure Slated by Industry in '52

And Holding of High Level Through '55 Is Forecast

JUST WHAT is the capital-spending picture in the food industry as we head into 1952? And what outlays may be expected to follow in '53, '54, and '55?

A survey by the McGraw-Hill Department of Economics indicates that this year's total capital expenditures by food companies will be at what might be termed a fairly normal level —$769 millions of dollars.

But the investment in modernization will be the highest in the industry's history. Never before have food processors shown more interest in better engineering methods and equipment which cuts costs and improves quality.

And in the immediate three years ahead, the industry is foreseen maintaining the $700-plus-million clip. Which is most significant. For in distinct contrast, the calculations indicate "all manufacturing" expenditures will decline some 35 percent from 1952 to 1955.

The expenditure gaged for '52 may be compared with the $946, $1,053, and $875 chalked up, respectively, for the years 1947-'49—a period of higher levels because then our industry had its "foot on the accelerator" to catch up with all the war-postponed needs for new capacity and modernization.

The year that followed—1950—saw capital expenditures rounded off to $760 But then Korea flared. And the augmented defense program that followed put new pressure to work. Hence, 1951 found food industry expenditures climbing back up to $930 millions. For the plants saw material restrictions bearing down and hastened to get some extra expenditures under the wire.

Outlays Running "Solid"

That the figure ranged for the current year—$769 millions—is "solid" is borne out by comparisons with other years It is considerably higher than the $670 of 1946. And it is nearly 80 percent over 1945's $434.

■ **But most important is the fact that the food companies intend to keep up right through 1955 at this substantial $700-$800 million dollar level.**

As a matter of fact, expenditures in the coming three years may, "when we get there," run higher than estimated. The reasoning here is that all such future spending plans are, naturally enough, influenced by a certain degree of "conservative pessimism" regarding the outlook for profits, the

(*Turn to page* 216)

Heavy Shift to *Modernization*

Food companies are ticketing fully 76 percent of their 1952 spending for replacement and modernization—as compared with 59 percent last year.

And 9 out of every 10 companies say modernization is the primary reason behind the expenditures they plan from 1953 through 1955.

Thus, the portion of the food industry outlay going to expansion—which bulked large in the immediate postwar years—had receded to 41 percent in 1951 and is dropping to 24 percent this year. Moreover, the portion earmarked for expansion is seen remaining down through 1955.

Asked regarding the specific purposes behind their planned '53-'55 investments, most companies gave more than one reason for their projects, hence the replies cannot be simply tabulated to add to a clearcut 100 percent by categories.

Nonetheless, the round-up of reasons is most revealing: 88 percent pointed to replacement and modernization as their target; 50 percent indicated they were aiming for more capacity for present products; 21 percent listed capacity for new products as their goal; and 17 percent said their expenditures would be for plants to serve new market areas.

TABLE I—FOOD INDUSTRY Capital Expenditures (Millions of Dollars)

	1939	1945	1946	1947	1948	1949	1950	1951
Yesterday*	243	434	670	946	1,053	875	760	930
		1952				1953	1954	1955
"Working" Today**		769		Planned Tomorrow**		710	816	754

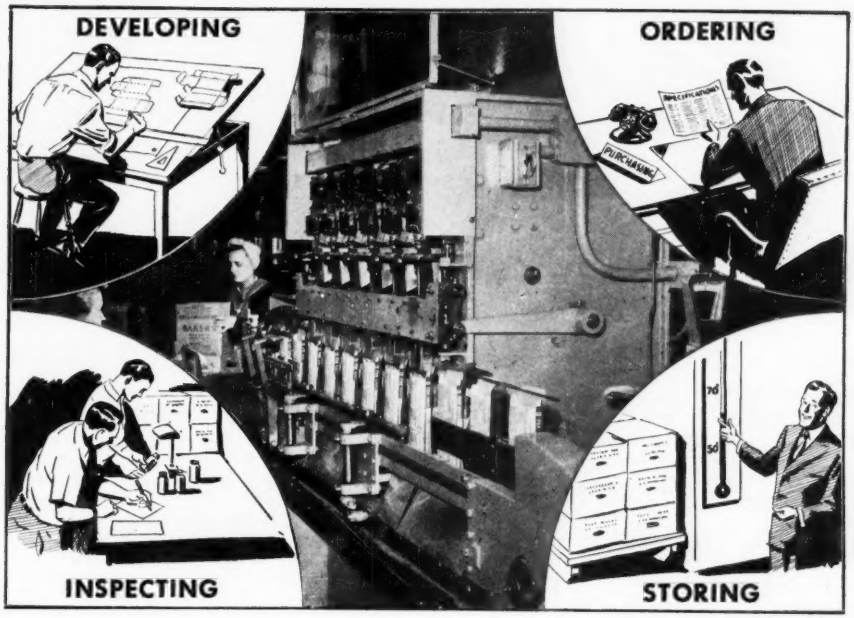
* U. S. Department of Commerce. ** McGraw-Hill Department of Economics.

TABLE II—HOW THE FOOD INDUSTRY Is Increasing Physical Capacity (1939 Equals 100)

Jan. 1946	Dec. 1948	Dec. 1949	Dec. 1950	Dec. 1951	Planned for 1952
117	135	138	143	152	156

Percent Increase 1950–'51: 6 Percent Increase 1951–'52: 3

FE Annual Packaging Report



Better Production-Line Performance From

PACKAGING MATERIALS

ATTENTION recently has been more sharply focused on the production-line performance of materials and containers.

The goal is higher packaging-line efficiency—faster throughput on automatic lines and less delay and downtime due to faulty materials.

The reason is the usual one. Rising fixed cost of production-line equipment, the high price of labor, and low profit margins, together with the trend upward in cost of materials. Couple this with the fact that packaging is a major part of most food-plant operations and of total product cost. Then you see the urgency of the need to have materials and containers geared to maximum production.

One food processor, for example, hits 95-100 percent efficiency on automatic carton machinery after allowing for time out, for oiling, changing paper, and making minor adjustments. Do you do as well?

To provide practical help in this direction, FOOD ENGINEERING presents this "how to" special report. It gives you pointers from authorities on developing a good production package, effects of material and container characteristics on line efficiency, proper ordering procedures, effective inspection of new shipments, and correct storage.

This information should help you to cut packaging costs in the months ahead. And we believe that the factors brought out will help those attending the Packaging Exposition at Atlantic City, April 1–4, to better evaluate the cost-saving advantages of the materials, containers, and machines exhibited.

In this Report—

Developing Your Packages for High Output . . 68
How Properties of Materials Affect Packaging Speeds 71
Nipping Production Slowdowns by Pre-Checking Supplies 75
Tips on Ordering Materials for Top Performance 78
Proper Storage of Your Stock Averts Line Headaches 80

CHECK on color of printed Wheaties cartons is carried out on shipments by headquarters products control laboratory.

TECHNICIANS in research packaging laboratory make Mullen, water-vapor permeability, and greaseproof tests.

Developing Your Packages For High Line Output

W. P. SCHOMMER

Manufacturing Department, General Mills, Inc., Minneapolis.

General Mills, Inc., like many other companies, spends considerable time and money studying packaging materials and package fabrication.

Experience has shown, however, that both the money and the time are well spent. They have made possible major advances in developing packages that meet the requirements of all our products and that give maximum packaging-line efficiency.

Here is how General Mills approached its current packaging program:

In 1946, it was decided that we could obtain the efficiency desired only one way—by more careful study of our packaging problems to determine more precisely the materials required and to write specifications, accordingly, which would give our suppliers better information for producing the materials needed for the high-speed packaging job.

It was obvious that no one person or department could carry out this program. Therefore, we established a packaging committee with members representing the packaging section of our research laboratories as well as our products control, purchasing, and manufacturing departments. Through the cooperative efforts of these departments, we have been able to improve our packaging-material position, thus bettering the quality of our packages and efficiency of our operations.

To illustrate, let's trace the design and development of a package from inception to completion, and then follow studies directed toward further improvements.

Check-List for Research

The packaging section of our research laboratories is basically responsible for the development of new packages. Its job is to create the type of package that will meet all product requirements. Here's a check-list which guides the staff in developing a package:

A. Make-up as determined by job package must perform.
   1. Size, determined from product weight, apparent density.

B. Functional characteristics.
   1. Moisture-proofness: Degree set by needs of product. Attainment determined by experimentally selecting materials and fabricating them into acceptable packages. Acceptability determined by tests.
   2. Grease-proofness: Same as for moisture-proofness.
   3. Strength: Determined by compression, tumbling, dropping, shipping, grocery-store handling, and vibration tests. Some of these tests at selected humidities, others at different temperatures.
   4. Flavor pick-up: Determined by storage tests.

C. Adaptability of package to production if it can be fabricated on existing machinery.
   1. Correlation of package size with machine size. Usually done by checking with machinery manufacturer.
   2. Preparation of detailed drawings of cartons, shells and/or labels.
   3. Determination of case size and strength.
   4. Ascertainment of package arrangement in case.

D. Adaptability of package to production, if machinery is non-existent.

E. Determination of extent to which commercially-produced packages attain standards set by experimental packages.

F. Periodic check after package is in production.

G. Cost of packaging materials.

As soon as the packaging section has arrived at the cubic content required in the container, the information is passed on to the advertising department, which immediately works out the design with an advertising agency.

Working on Design

After considerable work in its own shop, the agency submits package design recommendations to General Mills. These are reviewed by the merchandising, advertising, and manufacturing departments. Often, the submitted design or designs will be returned to the agency for further work. And the agency, in turn, will submit new recommendations until there is both advertising and merchandising approval. Meanwhile, the research, products control, and purchasing

departments continue working on materials to be used in the carton.

The "final" submitted by the agency is then consumer-tested to determine acceptability in terms of apparent size, brand-name impact, and color combinations. Also evaluated is how the package stands out in comparison with any competing product.

Making Test Runs

When all loose ends are tied and the package has been approved by the packaging committee, several thousand blank cartons and several rolls of liner paper are made and shipped to the packaging plant for testing under supervision of the packaging maintenance supervisor and the operating supervisor.

An observer records all phases of the run. Checks are made on speed, percentage of cooper, glue adhesion, score-line breaks, liner fabrication, and dimension of package as it conforms to the blocks or mandrels.

Making Further Changes

At the conclusion of the test run, a formal report is made to the manufacturing department in Minneapolis. If changes are recommended, they are passed on to the material supplier, who incorporates them in his next run.

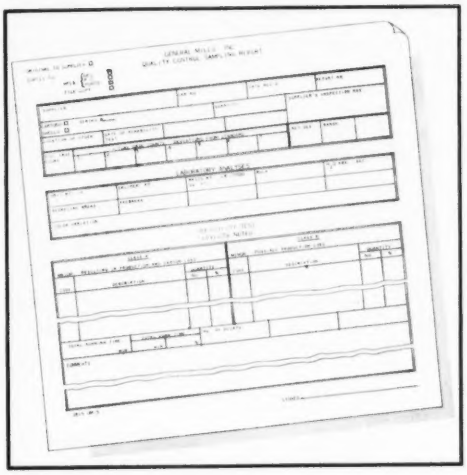
Preliminary specifications are written to cover the first run of the new package. As experience is gained, however, subsequent changes in specifications may be made.

In developing good packages, several important factors must be studied for their effect on a packaging operation. We have found that warping, poor scoring, bad pre-break, and improper die cutting cause trouble. Also variations in size, density, or caliper, as well as excessive ink bleed on glue flaps and brittle liner paper, produce major production problems.

We have tried to analyze these faulty conditions to see what tolerances we can allow and still maintain maximum efficiency. This work has continued over a long period, and we believe there is now enough information to write specifications which mean something.

We found that, after specifications had been set up, certain tests at the plant level had to be developed to control each shipment of packaging material. In setting up the testing programs, careful statistical control methods were used.

Q.C. Chart for Packages

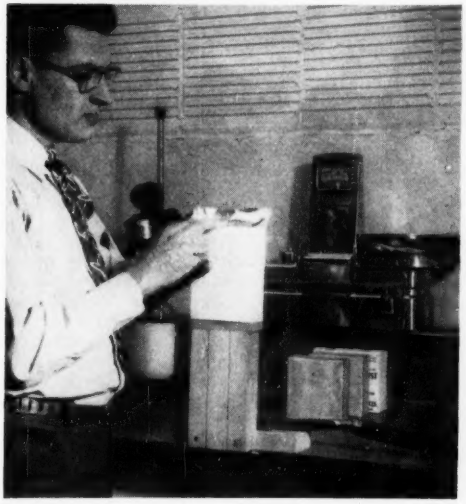


Inspecting Shipments

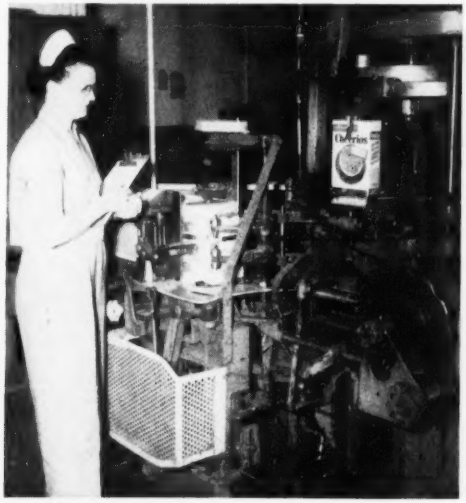
When a shipment of cartons arrives at our plant, a runability test is made. Seven cases per shipment are selected at random, inspected and put through packaging equipment as a preview of production performance. Results are recorded (see chart).

An actual count of cartons packed in each case is made and recorded as deviation from the standard. Each carton is then carefully inspected for all possible defects before

Development Steps



FIRST, technical work on new carton is completed in lab (above). Then after initial lot is received . . .



. . . **RUNABILITY** test is carried out on production line to check performance. Here, inspector gages output.

"Specs" Must be Issued With Orders

TABLE I—GENERAL PACKAGING MATERIALS SPECIFICATIONS for Carton "X" (glued)

General Data

Set-up size: 6⅝ x 2⅝ x 8⅝.
0.018 WPCNB*
Paste-end style. Economy flaps.
Glued on side seam.
Pre-break vertical scores. (Recommend 180 deg).
Perforate horizontal scores on two lower flaps (No. 2 and 4) of front and back main panels.**
Stock and ink to be free of objectionable contaminating odors.
Free of metal particles.
News side to be of clean appearance.
No board curl.
Avoid excessive application of offset spray (especially if wax).
Shipments upon receipt will be subjected to sampling for purposes of checking general quality, line performance, and laboratory testing

Printing Instructions

Pattern plates and progressive proofs to be supplied by General Mills.
Refer to purchase order (1) for series to be printed, and (2) for recollating or not collating series involved.
Printed 2 colors (flat inks). Orange and blue, per color guide.
Glue lap to be free of excessive ink bleed.
Minimize under/overrun.
Print: 1) Series No., Purchase Order No., month and year of printing run. Prefer "clock" device. Preferred location: Lower flap No. 3.; and 2) Manufacturer's name or symbol on upper flap No. 3.
Submission of press sheets: 2 dated press sheets should be mailed immediately from first day's run to advertising production department, General Mills, Minneapolis, and thereafter 2 daily (dated) press sheets mailed every third day through run.
Color and copy approvals by advertising production department.

*White Patent Coated Newsboard.

**Lower front and back panel flaps No. 2 and 4: Regular female scores. Male scores, 3 pieces of 2-point perforated scoring rules 1¼ in. length and 8 perforations to inch evenly spaced in two 6⅝-in. panels. Every other perforation broken out. End panels: Regular scoring on 2⅝-in. panels.

TABLE II—PHYSICAL PROPERTIES for Carton "X" (Glued)

	Av.	Min.	Max.
Basis weight (lb./1,000 sq. ft.)	75	67	83
Caliper (0.001 in.)	18	17	19
Ink smearing	Very slight	Allowable	...
Moisture	...	...	...
Mullen (lb./sq. in.)	..	50	...
Porosity (sec./100 ml.)	...	...	...
Score-line break (deg.)	...	...	50
Stiffness (M.D.*)	16	10	22
Stiffness (O.D.**)	4	3	5
Tear (M.D.*)	..	128	...
Tear (O.D.**)	...	192	...
Top-bottom score (in.)	...	...	15-32
Unit weight (g.)	50	45	55
Water absorption (sec.)	...	200	2,000

*M.D., machine direction.
**O.D., opposite direction.

being placed in the filler rack. All carton jams, downtime, and actual running time are recorded.

Type of Defects

Defects are classified as A and B. Class A are those which will cause downtime or carton losses on the packaging line. Torn flaps, incomplete die-cuts and stripping, poor scoring, defective glueing, warped cartons, and careless packing are a few of the difficulties in this classification.

Class B defects involve faulty printing, improper color, ink smears, and foreign material in the board. Such defects may not affect actual packaging operations, but they are usually detrimental to the appearance of the finished package.

A copy of this report, together with samples of various defective packages, is sent to the supplier and to the headquarters purchasing and products control departments for their review and follow-up.

Tests are made on suppliers' samples of liner paper, which are sent directly to our products control headquarters in Minneapolis. Here, in the package materials testing labortory, determinations are made on moisture-vapor permeability, greaseproof qualities, finished weights, basis and wax weights. A report of findings is sent directly to the vendor.

A recent experience at General Mills' cereal plant in Chicago shows how this system works, spotlighting the value of an advance knowledge of packaging materials. A sample of liner paper from a vendor was examined and found faulty. The shipment in our warehouse was then resampled and tested. Since this test confirmed our original results, the shipment was returned to the vendor.

If we had not issued specifications and if this paper had not been tested, it would have been used on our packaging lines, and we would have been plagued with no end of trouble, lost production, increased costs, and customer complaints.

Testing Cartons and Shells

Our plant laboratory tests each shipment of cartons and shells for basis weight, caliper, score evaluation, odor (shells), color and printing (cartons).

Importance of these tests is best exemplified by developments concerning a recent shipment of cartons: Examination by the plant laboratory revealed that a large percentage of the cartons had ink smears. When further sampling indicated that the entire shipment was bad, the vendor was notified and was given the choice of taking back the entire shipment or paying for the labor of sorting out the faulty cartons and giving us credit for the number thrown out. They accepted the latter. Without such quality control procedure, these cartons would have been run and many poor-appearing cartons would have reached the trade.

To many people, this program may seem rather complicated and expensive for what we might accomplish. To emphasize the value of analyzing and studying packaging materials, we cite the following experiences:

Several years ago, we decided to substitute a lighter,

16-point (0.016 in.) board for a heavier one in some of our packages. We hoped, of course, to save money and reduce our board usage during the war period. It was also felt that the efficiency of our packaging line was too low.

Consequently, tests were set up by our methods section to compare 16-pt. with 18-pt. board. The two caliper boards were run by the same supplier, and laboratory examination showed them comparable. They were then tested over a 60-day period on two lines under normal operating conditions, no change being made in the speed of the machines. An observer was assigned to each shift to record the results—which proved complete and factual.

Heavier Board Proves Better

The results showed that the 18-pt. board gave a better performance, both from the standpoint of packages produced per minute and percent of carton loss.

On Line No. 1, 55.7 16-pt. and 63.9 18-pt. packages were turned out per minute. Percent carton losses amounted to 1.1 for the 16-pt. and 0.5 for the 18-pt. board.

Packages produced per minute on Line No. 2 were 56.5 for 16-pt. board and 61.7 for 18-pt. board. Percent carton losses were 1.7 for the lighter board and 0.9 for the heavier one.

Thus, the 18-pt. board reduced average carton losses by 0.7 percent and increased productivity by 6.7 packages per minute. Obviously, the improved board was seen capable of showing real economies and improved efficiency.

The report also indicated signs of warping on the 16-pt. cartons, but none on the 18-pt. board, at the end of a 30-day storage period. This is very significant because warping can cause serious trouble and sharply reduce output.

In addition to improved efficiencies and savings, the 18-pt. board improved employee morale, saved product, and cut down on liner losses.

Trouble With High Gloss

Another example of the difficulties encountered before drawing up our specification system pertained to the finish of certain packages. One of our suppliers, without our knowledge, decided to try to improve the appearance of the containers by using a high-gloss finish. Result: A 30 percent loss in production. Moreover, additional crews had to be put on to meet scheduled production, and carton losses ran high.

Difficulties experienced were: (1) Cartons slid out of line in the feeding mechanism, (2) frequent adjustments had to be made on the machine, (3) the amount of product diverted to tailings in salvage of bad packages increased, and (4) score lines were not broken as well as in those packages with a dull finish.

Today, if we were to receive cartons of this type, our runability tests would catch this change, and the cartons would be returned to the vendor.

Air-Conditioned Packaging Room

It might be well to point out that no matter how good the packaging material, atmospheric conditions can definitely reduce its production-line efficiency. During the summer months, output can be reduced as much as 30 percent because of high temperatures and humidities.

High moisture content alters the operating characteristics of cartons, making them soft and causing jam-ups on bottom sealers and package makers. Wax coatings on liner papers become soft and accumulate on machine parts, necessitating shutdowns at short intervals for cleaning.

Hot, humid weather also affects the morale of employees. It tends to make them "let-down." Our packaging departments are now air conditioned. And we have found that a temperature of 80 deg. F. and a relative humidity of 40-50 percent are ideal.

The problem of getting better production-line performance from packaging materials is never-ending. Studies and development work are carried out on a continuing basis by our team made up of the research, products control, purchasing, and manufacturing departments.

To date, much of the credit for the success of our program should be given to our plant manufacturing and products control personnel, since they must run the tests and analyze the actual performance of packaging material.

We feel that development work has (1) improved our packaging efficiency, (2) raised the morale of our plant operators and employees, (3) provided our products control department with the necessary tools to check materials, (4) bettered relations with our suppliers by giving them a better idea of what we require, and (5) simplified our purchasing through the adoption of definite specifications.

How Properties of Materials Affect Packaging Speeds

F. G. MOREHOUSE and N. W. POSTWEILER

Assistant Director of Research and Packaging Engineer, respectively, National Biscuit Co., New York City

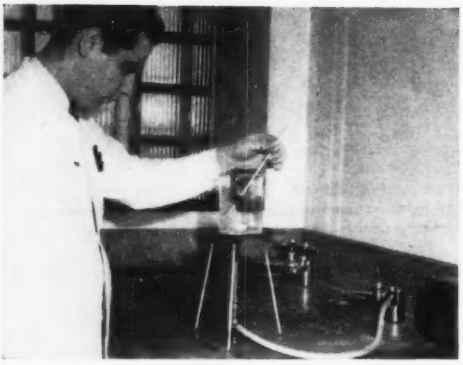
Modern production lines consist of a succession of machines, each with a rated production output of a specific number of units per minute.

Accordingly, equipment included on such a line is expected to produce satisfactory packages at the specified rate. And when it does, we say that the packaging equipment is operating at 100 percent efficiency.

Sometimes, however, this or that packaging machine will fail to maintain its production rate. In fact, it is quite common for operating difficulties to cause the efficiency to drop considerably below normal. And in rare cases, it may be impossible to even operate the equipment.

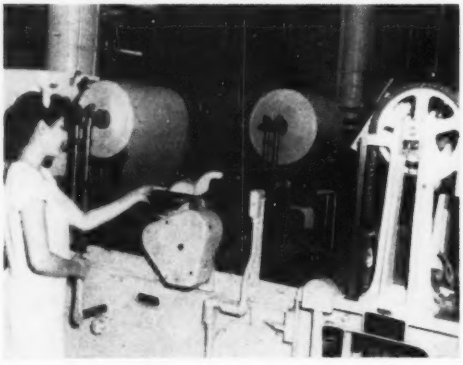
As for the role played here by materials, it is of course impossible, in an article of this length, to discuss all difficulties that can arise in connection with each one of the individual packaging components. Therefore, this discussion will be confined to the difficulties most likely to be encountered with the ordinary commercial-grade materials.

In operations involving hand-feeding of individual sheets of waxed paper to packaging equipment at a predetermined rate, it is sometimes very difficult to maintain the desired rate because the sheets stick together. In this case, the feeding operator is unable to lift the individual sheets from the pile in quick succession. And so, the machine will run

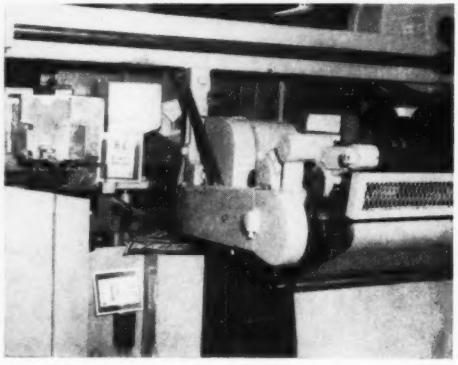


BY CHECKING melting point of waxes in waxed papers to make sure that it conforms to specifications . . .

AND BY MEASURING porosity of end seals for wrappers with this Gurley Densometer, and holding it to specs . . .



. . . DOWNTIME, on this carton-forming machine is minimized—since little wax accumulates on machines.



. . . END SEALS efficiently feed one at a time, insead of in multiples that cause a foul-up of working parts.

idle for significant fractions of the operating time, with resulting losses in efficiency.

The cause is likely to be traced to the paraffin used in waxing the paper. These waxes are graded according to their melting point. One with a melting point of 132 deg. F. has a much greater tendency to cause sheets to cling than one with a melting point of 140 F. A remedy for sticking, therefore, is to specify the latter grade paraffin.

Factor of Wax Melting Point

In the more modern packaging machines, the waxed paper is fed automatically from a roll rather than manually from a pile. In such equipment, paraffin not up to melting point specifications will accumulate on the tension rolls and other parts.

These accumulations occur more in summer than winter. They can interfere so seriously with proper machine operation that it becomes necessary to stop production at frequent intervals for cleaning.

Such difficulties can be considerably reduced by specifying the 140-deg.-F. wax. Even higher melting point values can be specified in extreme cases, but such grades are not readily available at suitable prices.

In connection with waxed papers, it should be stated that even those coated with 140-F. paraffin will become sticky in high temperatures. Waxed papers should be stored and used, if possible, at temperatures between 60-75 deg. F. However, excessively low storage temperatures should be avoided because of the danger of condensation of moisture when the papers are brought out into a warm, moist room. Waxed papers, for example, should never be stored at temperatures running as low as 30-40 deg. F.

Folding Cartons (Lock-End)

Many different styles, sizes, and shapes of plain folding lock-end cartons are formed, filled, closed, wrapped, and bundled with packaging machines that are set up in a straight line on the packing floor. When any one unit in the line fails to maintain 100 percent efficiency, production timing is, of course, disturbed.

One of the main causes of trouble is failure of the carton to form with sides, bottom, and ends all at right angles to each other. In other words, the carton is "out of square." The sides are bulged out and the bottom is rounded, sometimes to such an extent that the carton will not stand upright. A shapeless package of this kind will not pass smoothly through the machine.

There are two characteristics of folding cartons that contribute to this lack of "squareness." One factor causing bulge is lack of stiffness in the paperboard. With sufficient stiffness, walls and bottom of the carton properly tend to remain flat, the stiffness resisting formation of bulge.

The other factor is too much residual stiffness in the

scorelines. It is highly desirable that stiffness is reduced along scorelines to the lowest value possible without excessive weakening of the sheet.

A very light touch of the scoring blade is not enough, for then the paperboard remains practically unaffected. And when the carton is formed, the fibers along the scoreline spring back to their flat position, thereby forcing the walls and bottom to bulge.

Remedy for troubles of this kind is application of adequate specifications for cartonboard stiffness and for scoreline characteristics. Both of these properties can be measured by rather simple laboratory testing equipment. Proper attention to these qualities will be found very helpful in maintaining the packaging line at high efficiency.

Troubles With High Moisture

Another difficulty is excessive moisture in the paperboard, which can contribute to lack of squareness by sharply reducing stiffness of the carton walls and bottoms.

In addition, such paperboard cartons warp and curl. Both of these defects mean loss of operating efficiency. Mechanical grippers will sometimes miss the carton edge entirely if warping or curling has displaced the carton edge by a fraction of an inch.

Excessive moisture also weakens the paperboard to the extent that the locking parts at the ends of the carton will fail to engage each other properly. And, as a result, the carton will spring open when released from the machine.

Difficulties of this kind can be minimized by setting up a specification on the moisture content of the paperboard—a rather simple laboratory procedure. At 6-8 percent moisture, cartons will be reasonably troublefree.

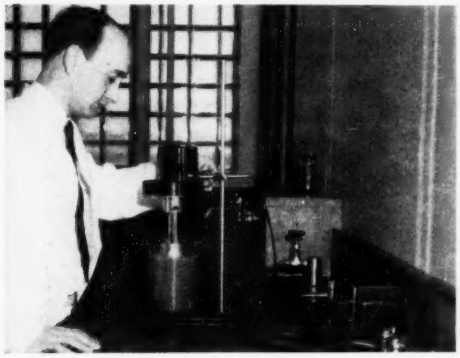
Given the proper moisture, cartons will hold it for considerable periods of time, provided the storage conditions are not extremely wet or dry.

Troubles With High Moisture

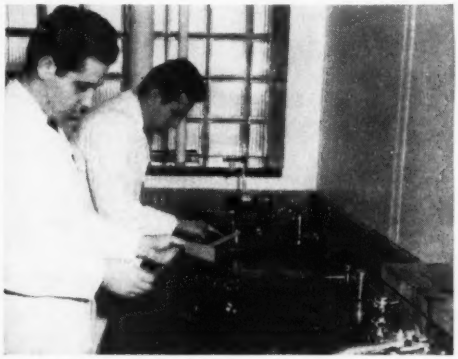
One of the difficulties most commonly encountered with glued-end cartons is the failure to glue them at the scheduled rate. Occasionally, it will be observed that when one lot of cartons runs out and the first of a new lot is being used, the new ones will fail to seal. Both lots may look alike and may even come from the same supplier, but one lot will seal and the other will not.

A common reason is lack of absorbency on the white face of the printed carton. The carton stock may be tested by playing a small stream of cold water on an unprinted portion of the white surface. If this portion comes out of the water stream in what appears to be a dry condition, instead of the surface accepting the water, it means the ordinary adhesives of the dextrine-in-water type will not penetrate the sealing surfaces of the carton.

In high-speed carton-sealing operations, pressure is applied to the glued surfaces. Purpose of this pressure is to force the watery part of the adhesive into the carton board and leave a sticky film of dextrine behind to form the bond.

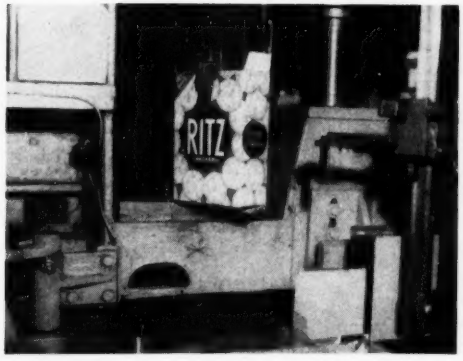


BY TESTING viscosity of adhesives with this Brookfield unit, and making certain it's right . . .

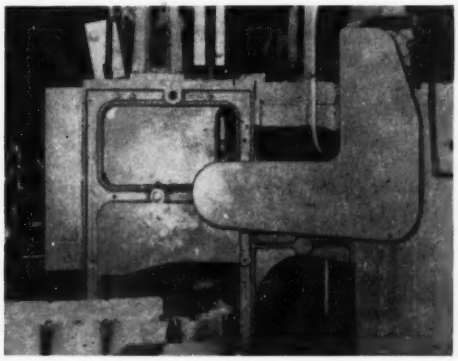


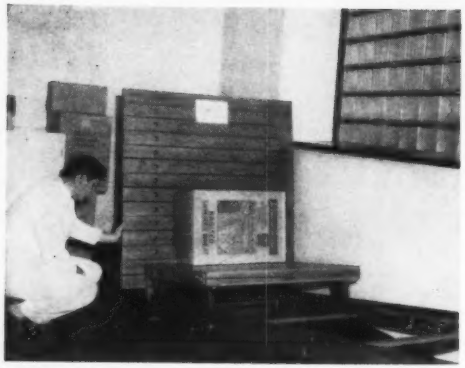
AND BY USING NBC scoreline tester (foreground) and Gurley stiffness tester (rear) for gaging paperboard . . .

. . . ADHESIVES with proper viscosity deposit uniformly on carton flaps, thus assure satisfactory seal.



. . . CARTONS coming from forming unit aren't plagued by bulging due to poor scoring or lack of stiffness.





AFTER putting cases of Shredded Wheat to this impact test to determine cause of damaged products, Nabisco research and production departments solved problem by using lower-cost cases that handle faster on lines.

If the board will not accept the water, then the sticky film will not form and the carton will spring open as soon as it is released from the machine.

Called for here is an absorbency specification for the paperboard cartons. Where printed cartons are concerned, such a specification is practically a necessity for efficient production at high speeds.

The trouble comes about because cartonboard manufacturers have a natural tendency to produce water-repellent board, since while making the board, they know it will be printed, and in their desire to produce a smooth sheet that will print well, they treat the white face of the paperboard with smoothing compounds of various kinds. Some of these compounds produce the water repellence which ultimately causes such a heavy sacrifice on production line efficiency.

However, an absorbency specification will serve as a constant reminder to the manufacturer that he must limit himself to those smoothing materials that will not cause the finished sheet to be too water-resistant.

Because printed cartons are of no value to anyone except the owner whose name is printed on their surface, desperate efforts are usually made to use up the printed water-repellent cartons even at a substantial sacrifice of operating efficiency. However, this efficiency sometimes can be increased by adding a small amount of caustic soda solution to the carton sealing adhesive prior to use.

But advice and assistance of the adhesive manufacturer's chemist should be solicited, because caustic soda solution has a very destructive effect on dextrine adhesives unless it is properly used. It is also very corrosive to the human skin and serious accidents have resulted from its use by inexperienced people.

Carton-Sealing Adhesives

Years ago, when packaging operations were much slower, the exact characteristics of the adhesives used for the sealing were not of major importance. However, the modern tendency is to greatly increased speeds, and the adhesives employed in our modern packaging machines must conform rather closely to the required standards if the production-line efficiency is to be maintained at the 100-percent level.

It would be beyond the scope of this article to go into an extended discussion of the many ways in which unsuitable adhesives can reduce packaging line efficiency. We will limit ourselves to mentioning only one property—the viscosity or "thickness" of the adhesive.

In practice on modern packaging units, the adhesive is usually pumped from a reservior to a glue pot and then returned to the reservoir. If the glue is too thick, it may be impossible to pump it, and the packages will receive no adhesive. On the other hand, an excessively thin glue that may pump freely likely will lack the thickness necessary for deposition of a uniform film on the sealing surface. In the absence of such a film, sealing will not take place at the desired speed and there will be a corresponding sacrifice of operating efficiency.

Correcting such difficulties by drafting specifications for adhesives is not as easy as one might expect. Viscosity is one property that can be specified with reasonable accuracy. But some of the other characteristics of adhesives are difficult to measure accurately enough, even in the laboratory, to provide the figures that are necessary for specification purposes.

Best practice is to consult the adhesive supplier when his product is suspect.

Materials Fed by Suction

Certain packaging materials, such as small paper end seals and the larger paper seals used on the end folds of bundled cartons, are automatically fed from a stack by suction. A small suction cup, applied to the top seal, lifts it from the pile and starts it on its way through the packaging operation.

Multiple feeding is a trouble often encountered in an operation of this kind. Instead of picking up one seal from the pile, two or three will be lifted. As a result, there is not only a serious waste of seals, but also a reduction in the operating efficiency of the equipment. The extra seals clog the machine so that it will no longer operate satisfactorily. They fall into the glue pot, and they get caught in the gears and belts. Finally, the equipment must be shut down and cleaned.

Cause of multiple feeding is excessive porousness (lack of density) in the paper seals being fed. Thus, the suction extends to the second and third seal in the pile and pulls three instead of one. On the other hand, if the paper seal has the right density, the top seal will effectively shield the second and third seals in the pile and only the top one will be picked up.

Remedy is adoption of a density specification. Paper density is gaged comparatively simply, so a figure may be readily set to eliminate multiple feeding.

Tearing of Cellophane

In packaging operations involving feeding of cellophane to a machine from a roll, the film will sometimes have a pronounced tendency to break. Strength of the cellophane, when tested by ordinary handling, may seem to be normal —yet tearing at the roll may persist.

Here, it is advisable to examine the edges of the cellophane for the presence of minute cracks or splits. These may be extremely small and very difficult to detect. But if the edge of the sheet is damaged in any way, the cellophane will frequently tear as it is pulled off the roll.

In order to minimize such a problem, care should be exercised in handling cellophane rolls. They should be left in their protective wrappings until just before use, and any unfinished rolls should be returned to their containers at the end of the day's operations. Cellophane stocks should be stored at a temperature and relative himidity that correspond approximately to the manufacturer's recommendations (usually given on the label).

Cellophane Sealing Troubles

Sealing of cellophane to itself by the application of heat is an operation that usually does not involve very much trouble, provided the sealing plates are clean and are adjusted to the correct temperature. Occasionally, sealing

difficulties are encountered, however, and when this occurs there are two or three possible causes that should be investigated after checking the temperature of the plate.

If the package giving sealing difficulty is small in size and net weight, it is entirely possible that the cellophane is too heavy and stiff. The grade of cellophane commonly known as No. 450 is about 1½ times as heavy and stiff as the lighter grade known as No. 300. It is more difficult to make small end folds with a stiffer sheet than with a more flexible one. If the No. 450 grade is in use, efficiency might be materially improved on small package work by changing to the No. 300 grade. There would also be a savings because of the greater number of square inches of cellophane per pound.

Another sealing trouble is caused by small amounts of dust or powder on the surface of the cellophane. Surprisingly, a quantity of dust too small to be seen without a magnifying glass will prevent the proper sealing of cellophane packages.

Another thing: Decorative printing should never be used on those areas of the cellophane surface that are to be sealed.

Consider the Shape of the Package

Proper specifications are only part of the story when it comes to packaging material problems. No matter how perfectly the different materials conform to specifications, production-line efficiency would be seriously affected if proper consideration is not given to the shape and size of the package itself.

Of course, we all realize that the sizes and shapes of packages are determined to a great extent by the interpretations of the ultimate consumer's desires. If production-line efficiency and economy were the only factors to consider in constructing a package, we would get an over-simplicity which would make a merchandising man shudder.

Likewise, if we left the construction designing entirely to the merchandising man, we would often get shapes and sizes which would be impossible to handle on a production-line basis. The answer is to compromise and sacrifice a little of the production-line efficiency to end up with a package meeting most of the requirements of the merchandising man.

Construction and specifications of a package, or its shipping unit, are quite frequently greatly influenced by the product's shipping requirements. In most instances at National Biscuit Co., board caliper and other material specifications are determined more by requirements that the packages withstand the rigors of distribution from the bakeries to the consumer than by the requirements of the production line itself.

Lesson of the Shredded Wheat

Many times, much faith is placed in materials which meet every standard which we set up—only to find, nonetheless, that we are experiencing difficulty in the field. An interesting case occurred a couple of years ago in connection with our twelve-biscuit package of Shredded Wheat:

A detailed study was made to determine why these biscuits were crushing. Ultimately, this study brought about a change in the construction of the shipping case. In turn, this change affected the specifications for the shipping case as well as the efficiency of the production line.

We found that compression on the sides of the case squeezed the individual biscuits on their strong sides. But these sides did not break under the impact. Instead, the tops—the weakest part of the biscuit—gave way upward, between pressure from both sides, breaking all the top shreds. When the pressure was removed, the broken shreds settled back down again, thus resulting in biscuits that appeared to have been smashed from above.

As a result of these findings, we replaced the 200-lb.-test Bliss-type case with a 175-lb.-test regular slotted carton with approximately the same material cost. The new regular slotted case lent itself to automatic case-loading equipment, with resulting labor savings.

This experience illustrated at least three important factors affecting the production-line operation:

1. It was proved here that a case made from materials which were of lower specifications (175-lb.-test regular slotted case vs. 200-lb.-test Bliss case) was far superior. Consequently, specification standards only tell part of the story. Thus, construction of a package is of prime importance.

2. Too often, when confronted with a packaging problem, we might accept the obvious too readily and miss the real cause of our trouble—as in this situation, where we thought damage to the top of our biscuits was caused from the top instead of from the sides.

3. Changing the construction of a packing medium, even though seemingly more costly at first, might lead to labor and other savings while aiding the production line.

Nipping Production Slowdowns By Pre-Checking Supplies

K. R. NEWMAN

Research Director, Burnett Div. of American Home Foods, Morris Plains, N. J.

Rigid adherence of containers to specifications is a must for high-speed lines equipped with automatic packaging machines.

When running at high speeds, such operations as conveying, filling, sealing, labeling, and casing call for containers that comply with specifications. And feeding the line with containers that are out-of-specifications is a direct invitation to costly stoppages.

But setting up specifications and merely issuing them to your suppliers is not enough. What's equally important is seeing to it that these specifications are adhered to rigidly.

Therefore, as a necessary supplement to container specifications, we, at American Home Foods, have adopted a sampling and inspection procedure for checking all incoming glassware.

Adopted with only few minor changes, was the Army Ordnance procedure. This double-sampling method is based on the recognition that a small number of samples, selected at random, is not a fair representation of a shipment, since the findings may fall either side of a true mean value and result in the acceptance of a lot that should

INSPECTORS examine incoming glass containers for evidence of defects. This inspection control assures production department of quality jars and bottles, thus preventing faulty performance on packaging lines.

have been rejected or in the rejection of a lot that should have been accepted.

The switch to container sampling and inspection procedure has brought about these five noteworthy benefits:

- **1. Assured our production department of uniform quality glass containers at all times.**
- **2. Reduced to a practical minimum, costly downtimes on high-speed, automatic packaging lines.**
- **3. Eliminated damage to equipment by faulty containers.**
- **4. Minimized losses due to breakage of containers.**
- **5. Decreased the variations in the percent of products filled into containers, particularly in the percent-fill of costly items.**

The Army Ordnance system of sampling requires an "acceptance quality level", a percentage figure included in the specifications. Prescribed are the size of a shipment (number of containers per shipment), number of containers to be checked for the first and second sampling of a shipment, and the "acceptance number" (number of defects in sample lot) for the lot size in each of four acceptable quality levels expressed as percent defective. These factors are listed in our accompanying table.

Checking Shipments

To illustrate, let's assume that a carload lot of small containers (over 110,000 units) has been received. Referring to the table, suppose that the acceptable quality level established by a food packer was 0.5 percent in the 0.31-0.50 percent range, then the first sampling would consist of 500 containers, selected at random. The second sampling would comprise 1,000 units.

For the first sampling, 4 defective containers would be the acceptance number. And it would be 13 for the combined first and second samplings.

To continue, let's suppose that the number of defects in the first sampling do not exceed 4. Then the lot or shipment is acceptable. However, if the number of defects in the first sampling is greater than 4, but less than 14, a second sampling of 1,000 containers must be made. The number of defects in the combined samplings should not exceed 13 if the lot is to be accepted. More than 13 defects in the first sampling would constitute rejection, without the need of a second sampling.

The action of accepting or rejecting a shipment of containers is secondary to the more important objective of evaluating the quality of ware received. Since a purchaser has contracted for acceptable ware, the inspection of glass containers—physically segregating the good from the bad—should not be considered his task. However, if the glass containers are inspected to evaluate the quality of shipments, then the data are useful for singling out suppliers of desirable ware.

Methods devised by a purchaser for the inspection of incoming ware can easily be duplicated by the glass container maker for checking his outgoing shipments. Then a shipment that fails to comply with a purchaser's specifications indicates some difficulty within the glass manufacturer's plant.

Containers have been effectively and satisfactorily standardized by manufacturers to permit efficient line operations, regardless of source of supply. And additional performance studies made on containers prompted a further call for specifications designed to improve the quality of the ware.

Defects now common to glass containers do not necessarily affect their performance on production lines. Defective containers—those that are not within tolerances set up for capacity, weight, and dimensions—are not the problem today that they formerly were.

About Defective Containers

Improvements in the manufacture of glass containers and wholehearted recognition of the requirements of the food packer have eliminated, for the most part, shipments of defective ware. Infrequently encountered today are freak containers. Occasionally, however, a spotty condition of misshapen glass or partially blown containers may escape detection by glass inspectors.

Other defects—such as "checks" (hairline breaks on the outer surface of containers), "splits" (cracks penetrating the entire thickness of the glass), and foreign matter—may not materially affect the performance of a container on the production line. However, these defects may prevent the container from performing its normal role in packaging —protection of the product.

Two general classifications, functional and non-functional, were established to simplify grouping the defects. Functional defects apply to those containers that fail to perform their intended purpose.

For example, those containers that do not seal properly, or maintain an hermetic seal, or withstand normal handling in the plant and during shipment—are functionally defective. Containers possessing non-functional defects may not impair their performance, but they are objectionable from a packaging standpoint.

Handling Incoming Supplies

Shipments of glass containers arriving in our Morris Plains, N. J., plant are immediately put into "quarantine," with the understanding that they are not available for production until approved by the control laboratory. A shipment containing ware of questionable quality stays quarantined until suitable disposition is made of the lot.

Disposition of a rejected lot is made by mutual decision between top management and the supplier. It may be decided to return the shipment to the supplier. Or, the container maker may choose to delegate an inspector to segregate the satisfactory containers from those that are defective.

All shipments are tagged upon arrival at the plant. Red tags are used for rejected lots, and green tags for accepted shipments. Green tagged shipments are immediately removed from quarantine, ready for the production department.

Listed on each tag are the identity of the supplier and the number of the freight car, date the shipment was received, and the size of the container. Disposition (acceptance or rejection) of the lot is noted, and the tag is signed by the inspector.

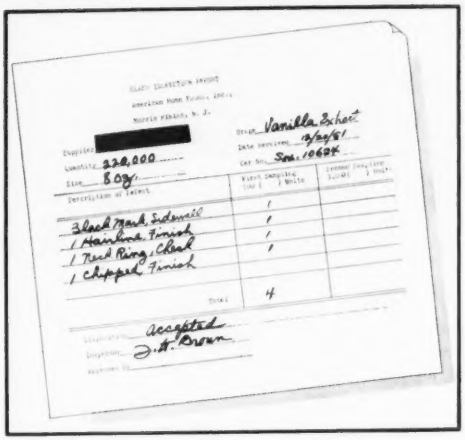
Keep Sufficient Backlog

Considerable flexibility is exercised in scheduling shipments to keep the production department constantly supplied with acceptable containers. First, a 3-4 weeks supply of suitable containers of various sizes is maintained in the warehouse to satisfy production requirements. Second, a backlog of a wide variety of different sizes—½, 1½, 2, 4, 8, 16, 32, and 128-oz containers—is maintained. And third, sampling and inspecting of carload shipments are carried on in the freight cars and, if accepted, the lot is routed directly to production.

In carrying out the sampling, an inspector from the laboratory selects, at random, 500 containers from a lot. If, for example, a shipping case holds 24 containers, then 20-21 cases are selected. Samples are then taken to the laboratory, where they are subjected to visual examinations.

Defects sought are fire checks, splits, faulty sealing surface, sunken finishes, partially blown containers, and foreign batch material.

Check Sheet for Glass Containers



In some cases, approximately one-half dozen of the samples are checked for size and dimensions. These non-visual checks cover overflow capacity, overall height, overall diameter, label recess (width, depth, and height from lower edge of bottom of jar), shoulder slope, minimum flat bearing surfaces (above and below label recess), minimum base bearing surface, and minimum wall thickness.

Checking Fill of Jars

Samples are also taken periodically from the filling lines to determine if the containers are being filled properly. Supposing that a filling machine has 16 filling tubes, then 16 or 32 containers are obtained to determine the average fill.

This is done by obtaining the gross weight of the containers filled with product, draining the contents from the containers, getting the tared weight, subtracting the tared weight from the gross weight to obtain the net weight of the product, and then dividing the net weight by specific gravity of the product to secure the fill.

The average fill is then established by dividing the total fill for all samples by the number of samples taken.

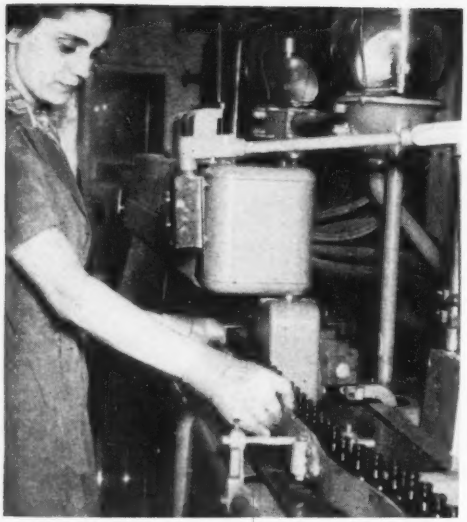
As the weight of a container increases, then the production department is likely to run into low fills (this being based on the assumption that the glass is blown to full mold dimensions). Low-filled containers require adjustment of a filling machine—filling tubes must be raised.

If, on the other hand, checks by the laboratory reveal overfilled containers, due to a decrease in the weight of a container, then the filling tubes must be lowered on the machine.

As a check on adequate capping, one-half to one dozen samples of capped bottles are periodically picked off the

TABLE I—QUALITY LEVELS for Glass Containers, Expressed in Acceptance Numbers

Acceptance Quality Level In % Defective	Shipment Size in Number of Units					
	8,000–21,999		22,000–109,999		110,000 and Over	
	1st Sample 200	2nd Sample 400	1st Sample 300	2nd Sample 600	1st Sample 500	2nd Sample 1,000
0.21–0.30	1	4	2	6	3	8
0.31–0.50	2	7	3	8	4	13
0.51–0.75	3	9	4	11	6	18
0.76–1.00	4	11	5	13	8	23



THIS kind of jamming of bottles going to filling machine is now prevented by double sampling procedure.

production line and torque-tested by laboratory technicians to determine if the caps are properly applied.

Learning From Mistakes

Through experience, we learn about mistakes as well as successes. Most of the time we learn about successes, and seldom about failures. However, knowledge of failures can be just as helpful as knowledge of successes, particularly if we learn the "whys" and "hows."

Food packers using glass containers definitely run into failures when using wares not conforming to specs.

For example, some bottlers of ketchup, carbonated beverages, and flavoring extracts have encountered trouble with bottle openings that are too small to accommodate the filling tubes. In this case, choking occurred—the filling tubes could not fit into the narrow openings. As a result, filling tubes broke off, spillage took place, and bottles were damaged.

In other cases, application of caps to bottles has either been difficult or impossible. And here it may be discovered that the thread on the finish of the bottle was improperly molded, thus preventing proper application of the screw cap.

Variations in dimensions of the body of glass containers have caused continued interruption in the operation of packaging lines. This is particularly true with flat-shaped containers that have round edges. Such containers frequently jam up on conveyors with side rails.

To illustrate, there has always been a greater tendency of our smaller size containers to give us trouble on our production lines. Reason: These small units are lighter and thus more susceptible to creating jam-ups on the conveyor lines.

And then when we switched to even lighter weight containers (particularly in the case of our ½-oz. bottles for vanilla extract), our troubles multiplied. This was because of variations in the shape and dimensions of the bottle.

We also lost some of the flat surfaces on the sides of the bottles. From experience, we learned that such flat surfaces had an advantage. They kept the bottles in even row on the conveyor and thus prevented, or at least minimized, jamming.

As for the new bottle, the difficulty was overcome by a simple redesigning. The slightly rounded edges were straightened out to give more flat surface.

Misshapen bottles can also adversely affect production-line performance. Instead of remaining in a vertical position on conveyor lines feeding filling machines, these bottles tend to tip slightly. And, as a result, the filling tubes do not center properly, hence tend to break. And the bottles are improperly filled.

Tips on Ordering Materials For Top Performance

ALBERT F. STEVENSON
Consultant, Packaging and Food Technology, Ridgewood, N. J.

Specifications should be set up and orders should be issued for packaging materials with two major objectives in mind—adequate protection of products and economical production-line performance.

A food-processing plant must be adequately equipped with an intelligently operated packaging laboratory if time and money are to be saved by working closely with the manufacturers of materials. In too many cases, plants are not so equipped.

The suppliers possess experience and the necessary laboratory facilities necessary to test and evaluate the physical properties of packages. And, through such mutual cooperation, both the suppliers and users can draw up specifications suitable for both—ones that will not adversely affect production in either plant.

After a new package has been designed, guarantees covering performance, fabrication, and protective properties of the materials should be written into the orders. These guarantees, together with a close check on the quality of the materials and proper use of them on the packaging lines, will assure excellent results in performance.

In an industry as new as the manufacture of special packaging films, too hard and fast specifications for such materials can easily work to the disadvantage of the packer. Guarantees on the performance of these packages constitute a safer and better course for the average processor.

General specifications affecting production-line performance for three major types of packages—metal cans, glass containers, and flexible materials—will be considered here.

First, the metal containers:

Food-industry users should accommodate themselves to standard items furnished by the manufacturers. However, in ordering the metal containers, food packers should specify not only the size and shape of the can, but the

type and weight of metal, the kind and amount of tinplate and enamel coating, and size of shipment (bulk or in cases).

Work With Suppliers

Can and label manufacturers are most cooperative. Let them help you out. Advise can manufacturers whether you desire paper labels or lithographed cans.

Obtain the size of the paper label required from can manufacturers, and pass this information on to the supplier of labels. Otherwise, you'll get improper size labels that will not roll on the cans properly.

Type, weight, and direction of grain of paper labels are important specifications. If these properties are not right for the purpose intended, labels will not wrap around cans properly and stay put.

After consulting with the manufacturers of metal containers and labels, contact your suppliers of adhesives and shipping cases. Work with both of them and draw up specifications for label adhesives and the size, weight, and type of shipping case.

All materials in the entire package must be guaranteed by the manufacturers to perform the jobs they are to do. And the packages must be subjected to actual performance tests before purchasing orders are issued. Several dozen cases of metal containers should be run through production lines under the supervision of the plant superintendent. Final approval from him that all packaging materials perform satisfactorily should be directed to the purchasing department, before an order is issued.

Now let's consider glass containers.

In contacting manufacturers of various materials, specify size and shape of jars, closures (caps), labels, and shipping cases. Submit a sufficient amount of product to the manufacturer for test purposes. Also supply him with information on net weight of product to be packed, type and speed of filling machine, how product is to be packed (air or vacuum), and details on properties of the food (percent of moisture and fat).

The manufacturer will then make suggestions as to the proper size and shape of jars, type of closures and liner, and size and construction of the shipping case.

Test-Runs on the Line

At this stage, at least two dozen cases of empty jars should be shipped to the food packer for production-line performance test purposes. Product should be machine-filled into the jars, which should then be capped, labeled, and cased.

Such tests will indicate whether: (1) Jars will hold the desired product weight, (2) caps provide an airtight seal, (3) labels are applied correctly, and (4) shipping cases meet size and weight specifications.

In event caps and glass jars are purchased from different suppliers, each should guarantee that both may be used together. In any event, suppliers should guarantee that their materials will perform satisfactorily on the user's production lines and that the jars and closures will produce a satisfactory package.

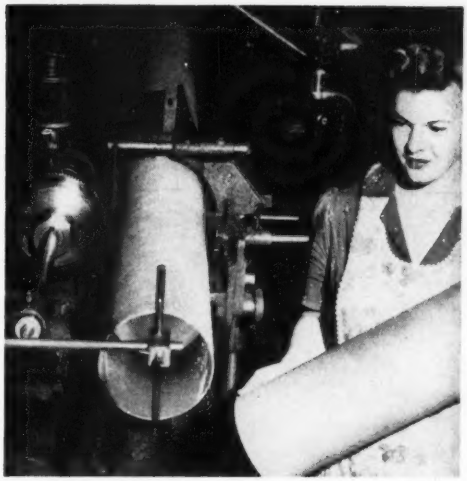
When selecting spot or wrap-around labels, have definitely in mind what size you want. Then contact manufacturers to learn what adhesive or labeler should be used.

And now to flexible containers:

Construction of these packages varies greatly. The number of combinations that may be used to make a flexible container is so great that it is necessary to roughly design the package before drawing up specifications.

Specifying Proper "Flexibles"

Greaseproof materials such as glassine or parchment must be considered for foods with a high fat content. If the fat-containing foods also require protection against moisture vapor, then the container should consist of a greaseproof material that is laminated to a moisture-protective film. Detailed studies should take into consideration not only the physical and functional properties of the films but also the laminating materials



MASS PRODUCTION of cans. Packers should check closely with manufacturer to get "right can for right product."

If the package is to be displayed on a shelf, then it should have a convenient form. Fairly large, inexpensive packages may only require decorated, satchel-bottom bags. For small packages holding one pound or less of product, a carton may be used, provided it is overwrapped with a printed, protective film.

In developing the package, no material should be used unless it serves a definite purpose in its construction.

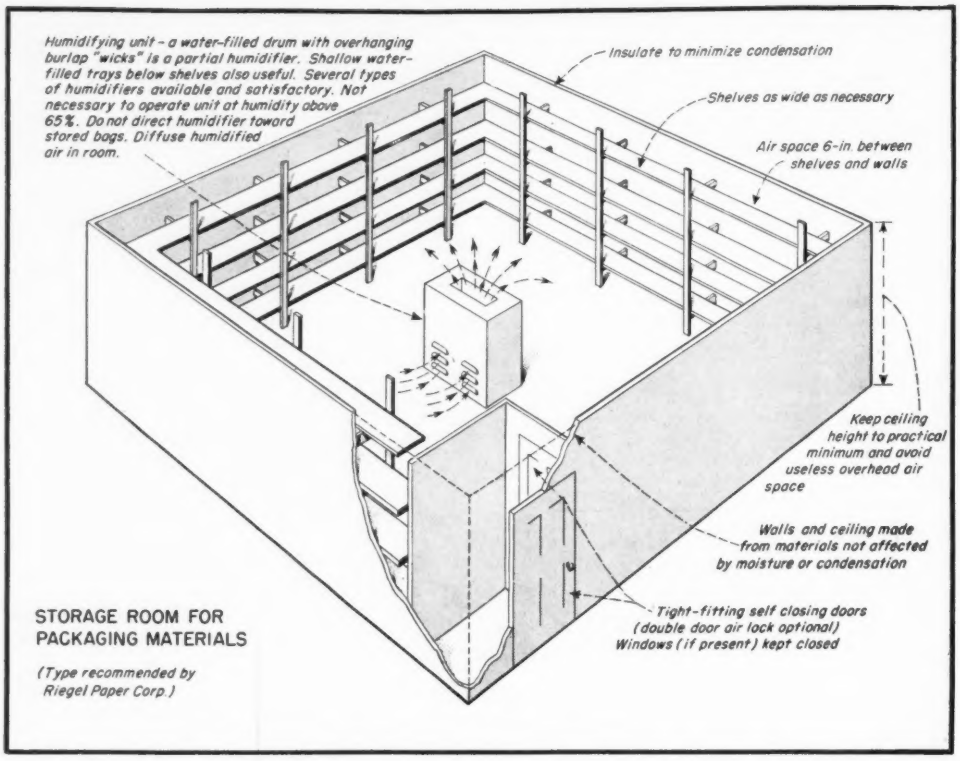
Suppose that a food processor wants to put a very hygroscopic product in envelopes and then pack one or more envelopes to a package. Also suppose he wants the packages to provide his product with a shelf-life of six months. Then, the percent of moisture picked up by the food product must be determined and a suitable moisture-proof package must be selected before the packaged item is subjected to shelf-life tests.

Seals Must Be Foolproof

Envelopes must be properly fabricated and all seals must be perfect, especially at the corners. Creasing weakens many flexible materials and destroys their moisture vapor-protective properties. In the event that the material cannot withstand creasing, then the folded edges should be sealed.

Envelopes are then packed in cartons which not only provide protection but also shape, strength, and display value. In addition to the weight of the cartonboard, specifications should also cover maximum percentage of moisture permissible in the carton. If the moisture content of the cartoning material is high and the carton is overwrapped, then this moisture is sealed into the package and will eventually get to the product.

An overwrap for a package of this type is extremely important. Its functional properties should be guaranteed if it serves protective and display purposes. Decorated, printed sheets should be tested for moistureproofness, since the inks can often destroy some of the protective surface coatings. Overwraps employed for protective purposes must be properly applied to assure a complete seal. This is solely the responsibility of the packer.


Humidifying unit – a water-filled drum with overhanging burlap "wicks" is a partial humidifier. Shallow water-filled trays below shelves also useful. Several types of humidifiers available and satisfactory. Not necessary to operate unit at humidity above 65%. Do not direct humidifier toward stored bags. Diffuse humidified air in room.
Insulate to minimize condensation
Shelves as wide as necessary
Air space 6-in. between shelves and walls
Keep ceiling height to practical minimum and avoid useless overhead air space
Walls and ceiling made from materials not affected by moisture or condensation
Tight-fitting self closing doors (double door air lock optional) Windows (if present) kept closed
STORAGE ROOM FOR PACKAGING MATERIALS
(Type recommended by Riegel Paper Corp.)

Proper Storage of Your Stock Averts Line Headaches

IVAN C. MILLER
Assistant Editor, "Food Engineering"

Higher packaging-line speeds require accurately controlled conditions for the storage of packaging materials. And even with slower operations, there are a few simple rules which will assure minimum downtime due to faulty materials.

For each package and type of material, there is a recommended temperature and humidity range which should be maintained during the storage.

Many materials are affected by sunlight or by heat from the sun. And storage near steam pipes, radiators, or other sources of heat, should be avoided.

Rules To Follow

All materials should be carefully handled to prevent damage to the original packages in which they are received. Stacks of any stock should be limited in height, and at no time should packages be stepped on.

It is advisable that all cases, rolls, and cartons be placed on skids, pallets, or scantlings raised a couple of inches above the floor.

Although some package materials are little effected by volatile gases, it is best to have the storage room well removed from odorous chemicals.

Deterioration of packaging materials is, to a large extent, a factor of time. Therefore, the smaller the inventory the greater the assurance of efficient packaging-line performance. For this reason, the "first in—first out" rule should be rigidly followed.

Packages in which the materials are shipped are designed to provide maximum protection. Except for inspection, it is important that they be kept closed until it is time to use them or time to condition them to packaging-room temperature. Then all unused sheets and rolls should be returned to the original package at the end of a run, even though the material will be used the next day.

Special Storage Rooms

Two suppliers recommend installing specially constructed rooms for storaging packaging materials. Details of con-

struction of the room recommended by Riegel Paper Corp., are shown in the accompanying sketch.

Milprint, Inc., suggests a 10x10x9-ft. up to 13x13x9-ft. room for the average user of cellophane. Apparatus for properly conditioning such a room is recommended.

Walls and ceilings of this inside storage chamber should be of tongue-and-groove dry lumber, covered on the outside with waterproof building paper sealed with a moistureproof compound. A partial or complete wooden barrier should be placed over the tar paper to avoid damage in areas where plant traffic is heavy. It is recommended that some type of unit heater and a circulating fan be included.

It is also suggested that periodic checks of storage humidity be made with a small sling psychrometer.

A small, standard, low-cost humidifier equipped with automatic control will keep 500- to 2,000-cu. ft. rooms at 65 percent relative humidity.

Paper, Films, Foils

Certain storage conditions may be ideal for papers, yet unsatisfactory for films. In fact, conditions under which one film can survive may be ruinous for another. For example, moistureproof cellophane requires a 50-65 percent relative humidity, while P.T. cellophane should be stored at a 30-45 percent relative humidity.

"Cello" Sheets, Rolls, Bags

Manufacturers and fabricators of cellophane differ slightly in their recommendations for ideal temperatures and humidities for storing cellophane. For example, Sylvania Div., of American Viscose Corp., recommends 70 deg. F. and a 40-45 percent humidity. Milprint, Inc., suggests storing cellophane at a 35-40 percent relative humidity and 70-75 deg. F.

Packages holding cellophane sheets, rolls, and bags have been designed to protect the contents for a short period, even though storage conditions may be severe. When cellophane and products fabricated from it are kept from a few months to more than a year, the storage conditions must be near the optimum. This is the reason behind the general rule of ordering not more than a two months' supply and using old stock first.

End and Edge Troubles

When cellophane is exposed to high humidities, moisture will be absorbed at the ends of rolls or edges of sheets, causing swelling and loosening at the roll ends or sheet edges. Conversely, when the humidity is too low, the ends or rolls and edges of sheets lose moisture and shrink.

High temperature also dries the edges of the film, and low temperature makes the edges swell and expand. Either condition may disrupt production. This is particularly true with the feeding and folding operations. Distortion of the edges of a seam seal will prevent an even distribution of adhesive, thus reducing a wrapping film's protection.

When low humidity makes film brittle at the edges, tearing near the feed end may take place. When fabricated bags are too dry, the seams and bottoms are weakened. Seams will rip as the bags are opened for filling, or the bottoms may break, thus spilling the contents.

The serious need for employing ideal temperatures and humidities for storing packaging film may best be illustrated by an incident that happened this winter. A once efficient packaging operation suddenly became a complete failure. The film was held responsible, and so the manufacturer was notified. The latter sent fresh stock and a technical representative. However, the fresh film acted no better than the previous stock.

But the supplier's technician soon found the answer: Glass panes were missing from a window adjacent to where the roll of film was being fed to the packaging machine.

TABLE I—BEST CONDITIONS for Storing Cellophane*

	Moistureproof	Non-Moistureproof
Sheet Stock		
Temperature (deg. F.)	65–75	65–75
Relative Humidity (percent)	35–65	35–50
Stacking (height)	Not over 12"	Not over 6"
Roll Stock		
Temperature (deg. F.)	65–75	65–75
Relative Humidity (percent)	35–50	35–50
Stacking Tubes	On end	On end
Stacking of cartons (height)	Not over 5'	Not over 5'
Bags		
Temperature (deg. F.)	65–75	65–75
Relative Humidity (percent)	50–65	30–45
Stacking of cartons (height)	Not over 8'	Not over 8'

*Prepared by Milprint, Inc., Milwaukee.

This permitted cold air to strike the film—making it so brittle that there was interference with the production-line operations.

Extended exposure to high temperatures has an even more severe effect on thermoplastic-coated, heat-sealable cellophane. Sealing or blocking of the film may not only interrupt production, but the product itself may become useless.

Rolls of cellophane should always be stacked on end, and not more than five high. If rolls are stacked on their sides, points of contact between rolls and between the bottom layer and the floor will become areas of adhesion. Then the rolls will jerk as they unwind.

Such action tends to disrupt production-line operation. And shearing of the film, a costly interruption, may occur.

Sheets of cellophane should not be stored in stacks over 12 in. high (PT cellophane not over 6 in. high). So to save space, they should be kept on shelves. Stacking too high causes sheets to stick together so that they will not separate freely at the packaging machine.

Storage conditions for printed cellophane are approximately the same as described above: 70 deg. F., 55 percent relative humidity.

Plain and Waxed Glassine

Storage for plain glassine should be the same as for cellophane. However, plain glassine that has been affected by extreme humidities or temperatures can be restored by holding it three or more days under optimum conditions. This is not true of brittle cellophane.

If the edges of sheets or rolls of glassine are cracked by rough handling, breaks in the film or tears in the sheet will slow operations on the production line. Rolls of glassine should be stacked like cellophane—on end and not more than five or six rolls high.

Waxed glassine requires greater storage care than the plain film. If the storage temperature is too high, even for short periods, slight melting of the wax will cause sheets to adhere. This not only interrupts production until the stock is replaced, but the stock must be discarded.

Walking on the packages or improper stacking can bring about the same results. Storage at 70 deg. F. with a relative humidity of 50-60 percent is recommended.

Foils require no special warehousing other than careful handling to prevent physical damage. Special requirements for paper-backed foil are the same as those for labels of that material.

Handling Pliofilm

Humidity has little effect on Pliofilm. However, this film softens and stretches at high temperatures. So the amount of heat to which the stock is exposed is important. Recommended is a storage temperature under 75 deg. F. Low temperatures have little effect on the film, provided the stock is brought to 70-75 deg. F. before using.

Sunlight has a bad effect on Pliofilm. Obviously, this film should never be stored near steam pipes, radiators, or

other sources of heat, for then premature aging will result.

Since Pliofilm absorbs foreign odors, the storage area should be well removed from chemicals such as turpentine, benzene, or other odorous volatiles.

Like with other films, rolls of Pliofilm should be stacked end up. If edges of the rolls are damaged, interruption of operations may be expected on the packaging line.

"First in—first out" has particular application to Pliofilm, especially where storage conditions are short of the optimum.

Cartons and Corrugated Boxes

Papers of any type constantly give off or absorb moisture with atmospheric changes. If they become too dry, they do not bend properly; if too moist, the material is weakened. Trouble on the automatic packaging line results.

Excessive moisture in a warehouse may cause boxes or folding cartons to expand. Excessive dryness will make them shrink. In either case, packaging difficulties may be expected.

Luckily, such conditions aren't permanent in most cases. A few days' exposure to optimum storage conditions will usually bring the material back to normal condition. A temperature between 50 and 75 deg. F. is advised, with the relative humidity range 45-70 percent.

Folded corrugated cases or cartons should not be stored on end, since they are apt to become distorted and slow down high-speed, automatic packaging lines.

Bundles or packages of corrugated boxes should not be tossed around or roughly handled, nor should anyone climb on top of them. Bundles of boxes should be carried—not pulled around by the rope that binds them.

Ideal way to handle all types of containers is to deliver them on pallets in loads approximating a 4-ft. cube. This practice not only simplifies handling, warehouse stacking, and inventory control, but it also protects the cartons and containers.

Boxes containing an asphalt-type moisture barrier are particularly susceptible to temperature extremes. Excess cold makes the asphalt brittle, while heat softens it, causing unsightly surface stains, often requiring stopping the production line to remove such packages.

Labels and Gummed Tape

Gummed labels and those made from coated stock will curl when the humidity is too high or too low. When the humidity drops below 40 percent, a slight curl forms toward the glued or the unglazed, uncoated surfaces. Conversely, a slight curl occurs away from the glue or toward the coated surface when the humidity is above 60 percent.

The greater the departure of relative humidity from the recommended 50 percent, the more curling of the labels and the greater the difficulty in obtaining smooth operation on the packaging line. Excessive curling causes production-line interruptions and slower speed in operations.

Thermoplastic labels, on the other hand, are not materially affected by the humidity in the storage room. Since the thermoplastic adhesive serves as a coating and the paper is coated on the other side, absorption or loss of moisture is much slower than in the case of other paper labels. However, when sufficient moisture is lost or absorbed to form a slight curl, 72 hr. of conditioning under optimum temperature and humidity should be sufficient to restore the flat surface of the label.

Thermoplastic labels stored at temperatures above 100 deg. F. are apt to block or stick together. If this adhesion is slight, the labels can be separated by riffling. Pressures also cause blocking, and they should be limited to 1 lb. per sq. in.

Gummed tapes are designed and intended to be water activated and are thus extremely susceptible to atmospheric moisture. During summer months, it is not uncommon for a roll of tape exposed over night to block so solidly that it is impossible to unwind it without tearing. Such blocking can be avoided by keeping the tape in its original package and controlling the relative humidity.

Traces of blocking have a serious affect on the adhesive value of the tape and will slow down sealing operations—or even make it necessary to discard the partially blocked rolls. It is this type of blocking that is both difficult to detect and to prevent. Where blocking, or "picking" as it is sometimes called, has occurred, the surface of the glue is covered with a layer of fibers which prevents subsequent satisfactory use.

To detect picked gumming, slowly unwind the roll, looking and listening for evidence of adhesion to adjoining layers. Hold a length to a light and look at the surface of the glue for fibers or for non-glossy areas. Run a finger along the ungummed paper back, and if the stock is rough and fuzzy, this is evidence of slight picking or blocking. Slight picking will slow down sealing operations when it is not necessary to discard the partially blocked rolls.

Storage in warm rooms with low relative humidity is recommended.

Crowns and Closures

Careless, improper handling of closures during storage may interrupt production schedules, bring about losses of product and containers, and increase operating costs. Loss of customers and consumer goodwill may also result.

Closures lined or gasketed with composition cork must be stored under carefully controlled temperatures and humidities. If the humidity is too low for a period of time, the cork will dry out and the closure will not provide a seal sufficient for carbonated products. And loss of carbonation is unlikely to be discovered until the consumer finds that the product is flat.

Rust, mildew, and other deterioration occurs when humidity is excessive for a prolonged period. Production delays may result and expensive closures wasted. Even if only occasional closures are rusted, their removal from the production line increases labor costs and reduces output.

To keep crowns in best condition throughout long storage periods, temperatures should be maintained between 60 and 70 deg. F. and the humidity between 45 and 65 percent. Temperatures above 70 deg. F. for an extended length of time will dry out the cork disks, with loss of pressure-holding properties.

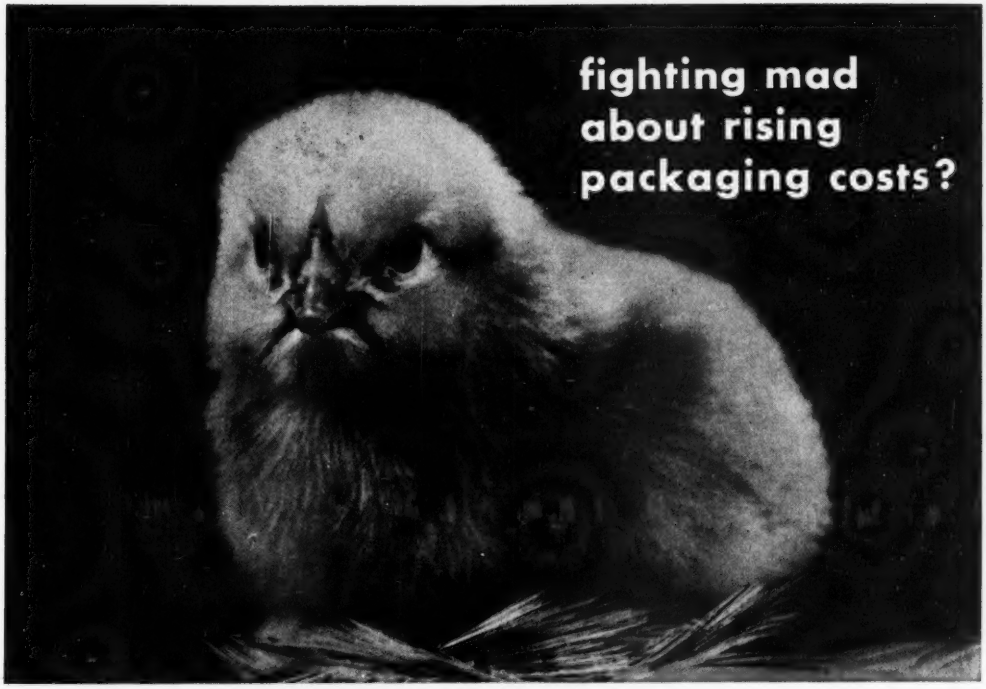
Relative humidities that are too low produce the same results, while high humidities are conducive to rust, mildew, and other deterioration.

Cartons should be stacked on painted or whitewashed wooden pallets or 2x4 seantlings, especially if the floor is of concrete. Best arrangement for stacking is in squares, eight cartons in the front, six deep, and eight high. Squares so arranged provide ample air circulation. Moreover, these squares should be at least 2 ft. from walls and a safe distance from steam pipes.

Careful handling of cartons containing closures is necessary to obtain top packaging-line performance. If cartons are dropped, some closures may be so distorted that they will break containers when they are applied. This disrupts production due to the need for clean-up.

Even cartons of closures may be adversely affected by improper storing—they may open up, fall apart, and spill the contents.

Acknowledgments are made to the following organizations for their cooperation in furnishing data employed in this portion of our report: Crown Cork & Seal Co.; Robert Gair Co., Inc.; Milprint, Inc.; Nashua Gummed & Coated Paper Co.; Riegel Paper Corp.; and Sylvania Div., American Viscose Corp.



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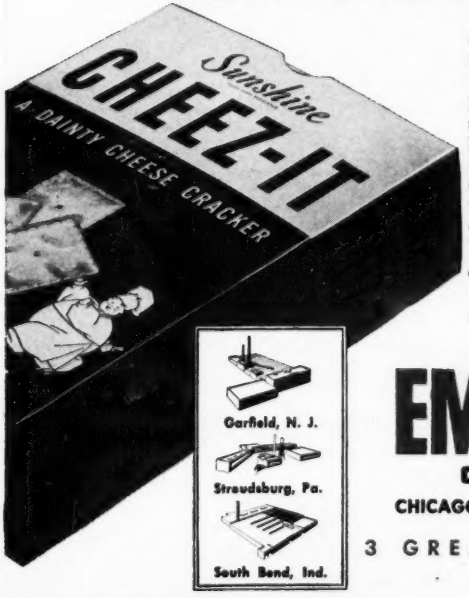

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BUTTER TUB LINERS & CIRCLES
BUTTER BOX LINERS

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VEGETABLE SHORTENING CARTON LINERS
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OLEOMARGARINE WRAPPERS
MEAT WRAPPERS

★

LINERS FOR MEAT TINS
POULTRY WRAPPERS
CHEESE WRAPPERS
TAMALE WRAPPERS
MANY OTHERS

WEST CARROLLTON PARCHMENT COMPANY • WEST CARROLLTON, OHIO

THE BEAGLE is always ready for the hunt. He is accustomed to hunting in a pack and when in action waves his tail gaily and obeys all commands quickly and cheerfully. Beagles should stand no higher than 15 inches.

In Boxes, too

The Pedigree is Assurance of Thoroughbred Stock

A "PEDIGREED BOX" results from integrated production, with quality control by one management from timber to finished box.

That's why American Sugar Refining Company uses Union boxes to provide safe packaging for Domino sugar from refinery to dealers' shelves.

75 years of undisputed leadership in paper packaging goes into Union boxes. Tremendous forest resources feed five of the largest paper machines in the world, in a completely integrated pulp-to-container plant unmatched in America for size and production. And four modern box plants, strategically located, serve you promptly and dependably.

Add all these *extra* assurances of consistent quality, dependable service and fair price and it's easy to see why every month more makers of national brand products are shipping in Union boxes.

UNION BAG & PAPER CORPORATION
CERTIFICATE OF BOX MAKER
THIS BOX CONFORMS TO ALL CONSTRUCTION REQUIREMENTS OF CONSOLIDATED FREIGHT CLASSIFICATION
BURSTING TEST 200 LBS. PER SQ. INCH
SIZE LIMIT 75 INCHES
GROSS WT. LT. 65 LBS.
GA.
Domino
Cane Sugar
Old Fashioned Brown

TRADE MARK UNION

Dependable Packaging Since 1872

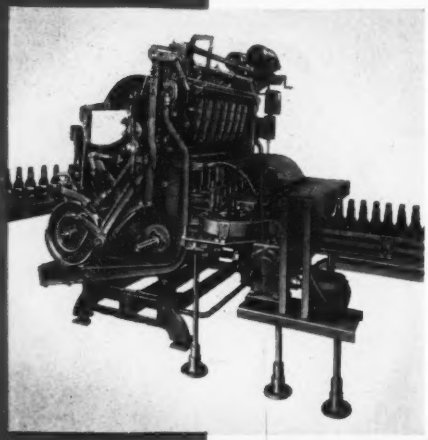
UNION Corrugated Containers

UNION BAG & Paper Corporation

Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N. Y.

***Corrugated Container Plants:* SAVANNAH, GEORGIA • CHICAGO, ILLINOIS • TRENTON, NEW JERSEY**

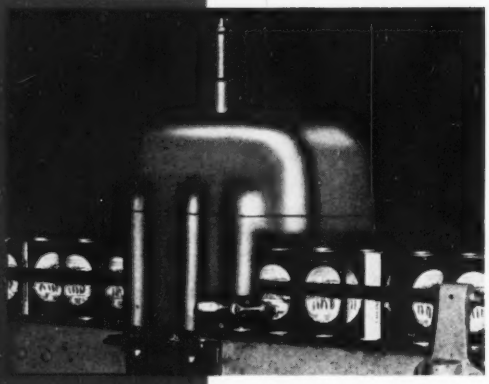
TWO BARRY-WEHMILLER AIDS TO BETTER PRODUCTION — Saving Time and Labor!



the ERMOLD Automatic Multiple Labeler

Because the multiple principle enables the Ermold to label containers in rows, you get high volume labeling at slow machine speed. Slow speed assures perfect, accurately registered, clean labeling; reduces jamming, breakage, and lost time. It's flexible, too, handling all standard size beverage bottles and food bottles and jars from half pint to quart size.

Design simplifies maintenance, assures long life with less wear. Fully automatic in operation.



the BRUCEWAY Can Marker

Requiring no outside power, the Bruceway Can Marker cuts your line costs by being activated by the movement of cans along the conveyor. It operates only when cans are moving on the line at speeds up to 600 per minute without adjustment or attention. The machine is simple and sturdy in design, weighs only 35 pounds and costs only a fraction of conventional equipment. It pays for itself in savings.

The advanced engineering and quality construction of all Barry-Wehmiller food processing equipment, including pasteurizers, coolers and freezers, may well cut your production costs, too. Write for information, sending your requirements.

BW BOTTLE CLEANERS · PASTEURIZERS & PROCESSORS

BARRY-WEHMILLER MACHINERY CO.

4660 WEST FLORISSANT AVENUE · ST. LOUIS 15, MO.

BW-280

True, he can't satisfy everyone. Even his best doesn't sound any too good. *But he's trying!*

We know. Even with increased production, demand for Visqueen* film far exceeds supply. It's DO material, in abbreviation and in a literal sense. The same superior qualities you like so well, and that have made Visqueen so popular, are urgently needed for defense. (And every effort is being made to see that's where it goes.)

However, there are indications that Visqueen might be available for your civilian needs in the months to come. So remember, if you have a defense order . . . investigate packaging with Visqueen. If you have a civilian requirement . . . consult us before using a substitute. *Do it better*—do it with Visqueen!

IMPORTANT! Visqueen film is all polyethylene, *but* not all polyethylene is Visqueen. Visqueen is the only film produced by process of U.S. Patent No. 2461975. Only Visqueen has the benefit of research and extensive technical experience of The Visking Corporation, pioneers in the development of polyethylene film.

Visqueen Packaging Firsts!

- liquid and dry chemicals and pharmaceuticals in drums, cartons and cases.
- weather balloons for armed forces
- bags for batteries for armed forces
- packaging of small machine parts (for moisture protection)
- rubber separators (as in camelback)
- liners for multi-walled bags
- bags for pre-peeled potatoes
- sterling silver flatware and hollow ware (as tarnish resistor)
- bags for poultry

VISQUEEN* film

*T. M. The Visking Corporation

. . . a product of THE **VISKING** CORPORATION • Preston Division, Terre Haute, Indiana

FAMOUS PRODUCTS

GAIR SHIPPING C

ROBERT GAIR COMPANY, INC.,

PAPERBOARD • FOLDING

GO TO SUPER MARKETS IN

ONTAINERS and...

GAIR FOLDING CARTONS

GAIR Multicolor Cartons present a dramatic selling medium for your product when it goes to market . . . a medium of distinction so powerful that it "*Sells On Sight*." Yes, GAIR cartons are a great stimulus to impulse buying which is a potent factor in today's "self-service" SUPER MARKETS.

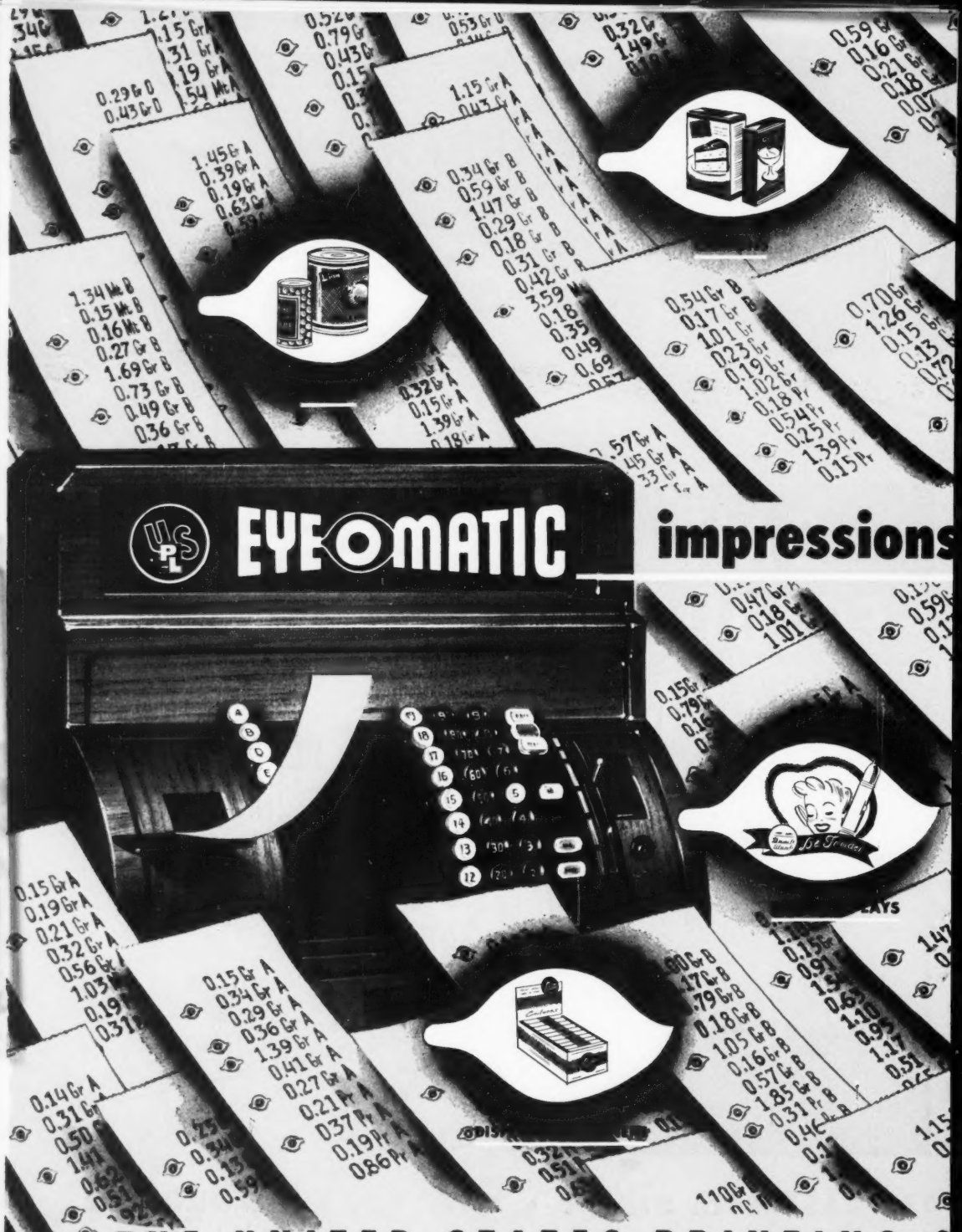
GAIR CORRUGATED CONTAINERS offer the utmost PROTECTION against the many hazards of shipping . . . truly amazing how they withstand tremendous knocking about and rough usage.

WRITE TODAY
for samples and technical information.

GAIR®

155 EAST 44th STREET • NEW YORK • TORONTO

CARTONS • SHIPPING CONTAINERS


USPL
EYE-O-MATIC
impressions
THE UNITED STATES PRINTING &
EXECUTIVE OFFICES: CINCINNATI 12, OHIO • Sales Offices in Principal Cities

HERE IS THE PAY-OFF!—zillions of little cash register tapes, every day. Each a mute evidence that **EYE-O-MATIC COLOR** is on the job—catching eyes, winning interest, creating desires, stirring emotions, and causing buying hands to reach, take and pay for.

stop in to see U·S

and inspect typical specimens of **EYE-O-MATIC** advertising and packaging materials; you'll find ideas, suggestions and superb art work and design, in flawless reproduction, emanating from some of the world's keenest specialists in the preparation and use of sales building materials.

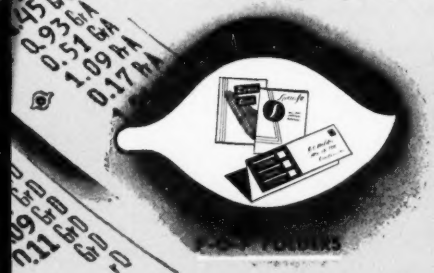
PAYOFF at POINT of SALE

THAT'S THE DAILY STORY of big-volume marketing—involving the products of hundreds of U-S customers, whose mounting sales are supported by all the forms of **EYE-O-MATIC** packaging and advertising materials.

THE POINT-OF-SALE is the point of focus for every successful product. Hundreds of manufacturers have used **EYE-O-MATIC** selling support for many years—in the form of labels, folding cartons, point of purchase displays, outdoor posters, calendars, booklets and folders.

A MAJOR CONSIDERATION, in their repeated choice of U-S **EYE-O-MATIC** packaging and advertising materials, is the one-stop, nation-wide service backed by more than eighty years of experience in design, research, and superb reproduction—in short, **EYE-O-MATIC** selling power.

LET US SHOW you interesting examples pertinent to your business. A card or memo will bring prompt action.



AT BOTH BIG SHOWS

NATIONAL PACKAGING EXPOSITION

Atlantic City • APRIL 1-4

BOOTH 275 CONVENTION HALL

POINT OF PURCHASE ADVERTISING EXHIBIT

New York • APRIL 1-3

BOOTH A-1 WALDORF ASTORIA HOTEL

LITHOGRAPH COMPANY

Six Modern Plants: Baltimore, Md. • Cincinnati, O. • Erie, Pa. • Minoola, N.Y. • Redwood City, Calif. • St. Charles, Ill.

there's an idea here for you!
FOR THIS GIANT PENCIL BOX
WITH PLAY BALL TOP
AND 6 HIGH GRADE PENCILS
MAIL 25¢
AND
15 DUM-DUM WRAPPERS
TO DUM-DUMS
BELLEVUE, OHIO
EAT 1¢ DUM-DUMS "THE WORLD'S BEST POP" WITH PAPER SAFETY STIX
PLEASE RUSH THIS SHIPMENT OF
1¢ DUM-DUMS TO-

sweeten your profits with effective H & D packaging

Dum-Dums candy "pops" are *shipped in* and *sold from* this double duty display box. As an easily set up display unit, complete with premium, the box provides the point-of-purchase promotion that means increased sales—without the cost of display material. As a sturdy shipping box, it provides adequate product protection in shipment and in storage. This idea is adaptable to many types of products. It's a typical development of the H & D Package Laboratory, which is ready to help you with *any* packaging problem, for *any* product. For free booklet, "Pack To Attract," write Hinde & Dauch, 5210 Decatur Street, Sandusky, Ohio.

H&D

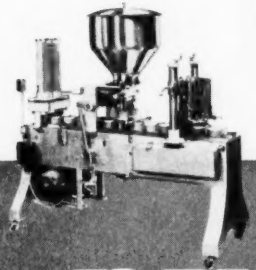
HINDE & DAUCH

Authority on Packaging

Akron, Baltimore, Battle Creek, Mich., Bloomington, Ill., Buffalo, Chicago, Cincinnati, Cleveland, Columbus, Denver, Detroit, Fairfield, Conn., Findlay, Ohio, Gloucester City, N. J., Greensboro, N. C., Hoboken, Indianapolis, Jamestown, N. Y., Kansas City, Lonely, N. C. Minneapolis, Omaha, Plymouth, Ind., Reading, Pa., Richmond, Va., Roanoke, Va., Rochester, Sandusky, Ohio, Shrewsbury, Mass., St. Louis, Toledo, Westerlawn, Mass.

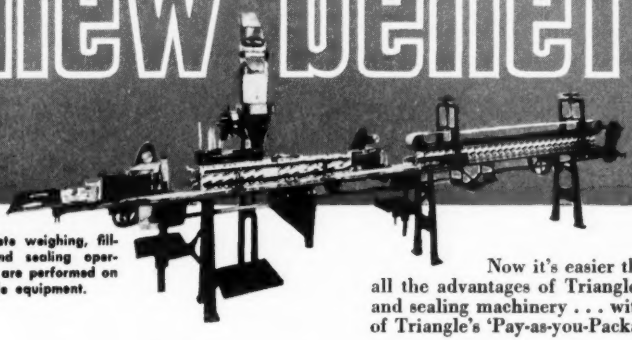
Now... Triangle's 'pay-as-you-package' plan BRINGS YOU

Triangle offers a complete line of weighing and filling equipment — such as the Triangle Elec-Tri-Pak.



The Triangle-Bagby line includes filling equipment for dairy and other semi-liquid food products.

new benefits



Complete weighing, filling and sealing operations are performed on Triangle equipment.

Now it's easier than ever to obtain all the advantages of Triangle weighing, filling and sealing machinery . . . with the added help of Triangle's 'Pay-as-you-Package' Plan.

In many cases, just a part of the savings earned with new Triangle equipment covers its cost. Manpower and time savings quickly recover your investment . . . and quickly show substantial new profits for you.

There's a Triangle or Triangle-Bagby machine to meet your exact requirements . . . to fill all dry and semi-liquid food, bakery and dairy products.

It costs nothing to get all the facts . . . and there's no obligation.

If you're wondering, *"When* should I buy new packaging machinery?" . . . read this . . .

See us in Booth 624-26 at the Packaging Exposition, Atlantic City, April 1-4

Sales offices in New York Newark Boston Jacksonville Dallas Denver Los Angeles Portland Montreal Mexico City

TRIANGLE PACKAGE MACHINERY CO.
6637 W. Diversey Avenue
Chicago 35, Illinois

Return this coupon TODAY

TRIANGLE PACKAGE MACHINERY CO.
6637 W. Diversey Avenue, Chicago 35, Ill.
Send complete facts about your 'Pay-as-you-Package' Plan. We fill.....(product).
Name .....
Company .....
Address .....
City .....Zone....State.....

A Star Quartet of Economical, Sales-Building Packages

for Your Products

Bemis Deltaseal®

—This long-time favorite has exclusive pull-cut-pour spout. Billboards your brand . . . and flat tops and bottoms help build excellent mass displays.

Bemis Deltaphane®

—If your trade prefers a window package, Bemis Deltaphane, with the "picture window," is your best bet. Your brand in crisp, bright colors on all four sides. Has the pull-cut-pour top, too.

Bemis Cellophane

—There's an increasing demand for the *show window* bags—Bemis Cellophane. Bemis' bright, eye-catching printing makes your brand shine like a headlight.

Bemis Flexi-Carton®

—Sturdy, gusseted bag, single-, 2- or 3-ply. A fine shelf package, with your brand printed on all sides. Closures: sewing, taping, stapling, pasting.

Here's another bonus for you . . . Bemis Deltaseal Packaging System closes all of these types of bags (except Flexi-Carton), so you can meet the varied demands of your trade. Deltaseal Packaging System is the most economical packaging operation for you . . . proof on request.

Bemis is also your best source for Burlap, Cotton, Multiwall, Paper and Waterproof Bags. Ask your Bemis Man for the complete story.

Bemis

THERE'S A BEMIS PLANT OR SALES OFFICE NEAR YOU—

Baltimore • Boise • Boston • Brooklyn • Buffalo • Charlotte • Chicago • Cleveland Denver • Detroit • East Pepperell, Mass. • Houston • Indianapolis • Kansas City Jacksonville, Fla. • Los Angeles • Louisville • Memphis • Minneapolis • Mobile New Orleans • New York City • Norfolk • Oklahoma City • Omaha • Peoria Philadelphia • Phoenix • Pittsburgh • St. Louis • Salina • Salt Lake City • Seattle San Francisco • Vancouver, Wash. • Wichita • Wilmington, Calif.

ONE OF THESE 5

WORLD LABELERS

IS

the best Labeler in the World for you

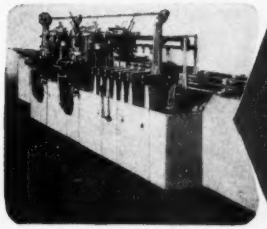
Which one, in your case, depends on

your production needs
your label types and sizes
your glass container shapes and sizes

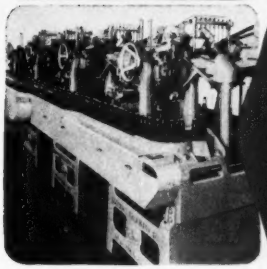
Once we have the story we are in the world's best position to recommend the best Labeler in the WORLD, because no one else makes such a complete range of Semi-Automatic and Full Automatic Labelers.

Whatever your label application problem, put it up to us to demonstrate which one of these five is the best Labeler in the World for *you*.

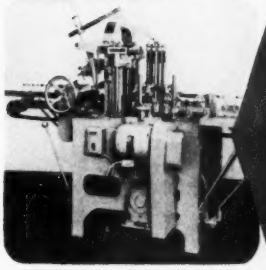
SEE THE WORLD
AT BOOTH NUMBERS 705-706
Packaging Exposition — Atlantic City



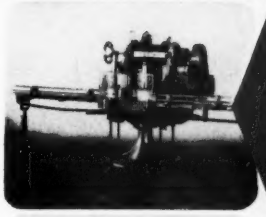
WORLD BEE-LINE



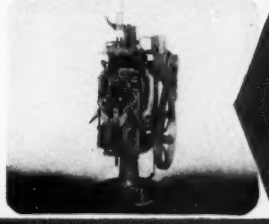
WORLD TANDEM



WORLD TURRET



WORLD ROTARY

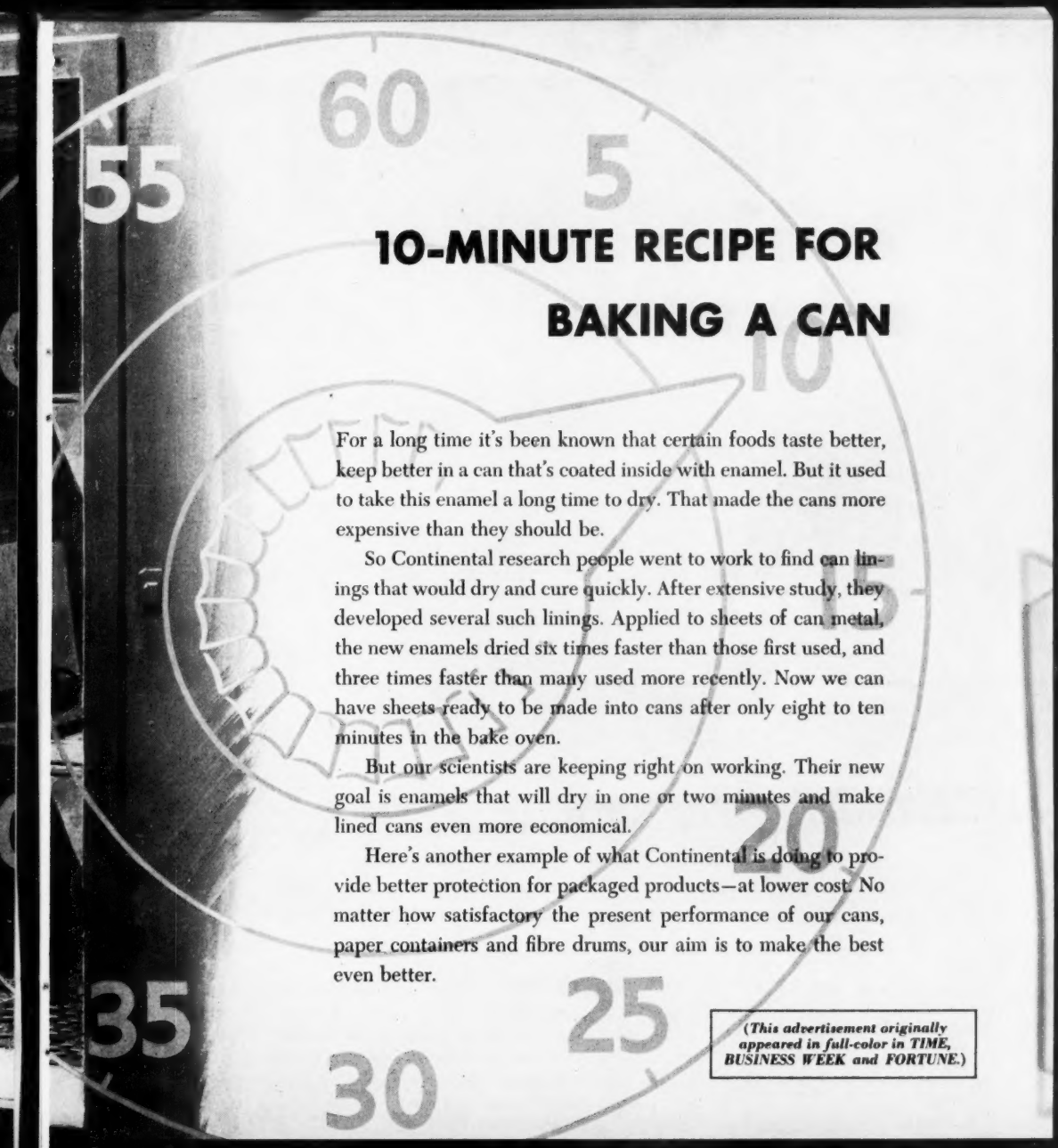


WORLD MODEL "S"
(Semi-Automatic)

ECONOMIC MACHINERY COMPANY
WORCESTER 3, MASSACHUSETTS
DIVISION OF GEO. J. MEYER MANUFACTURING CO.
MILWAUKEE, WISCONSIN

"YOU GET THE BEST LABELERS IN THE WORLD"

SERVING INDUSTRY
. . . SERVING AMERICA
You are always close to Continental Can with its 65 plants in the United States, Canada and Cuba, 17 field research laboratories and 63 sales offices.



10-MINUTE RECIPE FOR BAKING A CAN

For a long time it's been known that certain foods taste better, keep better in a can that's coated inside with enamel. But it used to take this enamel a long time to dry. That made the cans more expensive than they should be.

So Continental research people went to work to find can linings that would dry and cure quickly. After extensive study, they developed several such linings. Applied to sheets of can metal, the new enamels dried six times faster than those first used, and three times faster than many used more recently. Now we can have sheets ready to be made into cans after only eight to ten minutes in the bake oven.

But our scientists are keeping right on working. Their new goal is enamels that will dry in one or two minutes and make lined cans even more economical.

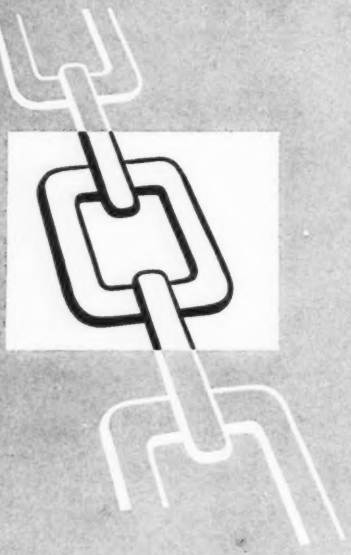
Here's another example of what Continental is doing to provide better protection for packaged products—at lower cost. No matter how satisfactory the present performance of our cans, paper containers and fibre drums, our aim is to make the best even better.

(This advertisement originally appeared in full-color in TIME, BUSINESS WEEK and FORTUNE.)

CONTINENTAL CAN COMPANY

CONTINENTAL CAN BUILDING — 100 E. 42nd ST., NEW YORK 17, N. Y.

weak link?



DUO-TITE . . . . . .

the perfect "No-Sift" bag. Ideal for insecticides, fertilizers, chemicals, any products which must be packaged in siftproof containers. Its sturdy construction combines special liners with folding, gluing and heat-sealing.

THERMOSEAL . . . . .

the bag with 20% more protection. It's a fact. There is 20% more protection in Betner's THERMOSEAL than in other closures. Eliminates staples. Insures water-vapor protection, siftproofness, and retention of flavor.

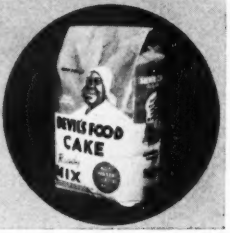
LAMOFILM . . . . . .

the bag with extreme moisture-impregnability. Locks moisture out. Protects freshness, flavor, goodness of food by a patented film of rubberized compound held firmly in suspension between two layers of glassine.

FLAV-O-TAINER . . .

the bag with vacuum-packed freshness. Pliofilm* lined, all inner seams are hermetically sealed. Replacing air with inert gas, and sealing top, FLAV-O-TAINER becomes an airtight unit. Used whenever freshness is a must.

*Mfd. by Goodyear T. & R. Co.



Betner's service is complete . . . from idea to finished bag. Let Betner recommend the proper machinery for closing bags and inserting liner bags in cartons.

NO SIREE! Packaging need never be the weak link in your distribution chain if it's Betner engineered. No matter what the packaging problem—design, production or sales appeal—Betner's skilled technicians and their years of experienced "know-how" have been producing outstanding and fool-proof bags for thousands of satisfied clients. May we help you with your problem? Drop us a line.

Whatever the packaging need, there's a Betner bag...FILL IT!

BENJ C BETNER CO *Devon, Pa.*

PLANTS ALSO LOCATED IN:
- *RICHMOND, VIRGINIA*
- *PARIS, TEXAS*
- *APPLETON, WISCONSIN*
- *LOS ANGELES, CALIFORNIA*

The Marathon Packette! It's new! It's a sales maker! It's an important addition to the famous line of Marathon's original Linerless Ice Cream Cartons. Retailers like this single portion linerless! It has terrific mass display value. Shoppers stop and select the flavors in any combination they desire. Try a jumbled display and watch sales zoom. Just like the big selling Pint Linerless, the Packette has side opening flap . . . when opened the ice cream stays intact, all ready to serve.

New Packette!

Packs Sales Punch!

Engineered for production and sales

Marathon's line-of-three Linerless Ice Cream Cartons consists of half-gallon, pint and individual serving size. All are engineered for automatic or semi-automatic set-up and filling. Linerless Cartons fold flat and store flat to save space. Marathon Linerless Cartons, beautifully printed in 2, 3, or 4 colors, attract consumer attention, boost sales. If you want to increase ice cream volume, see your Marathon salesman or write Marathon Corporation, Menasha, Wisconsin.

Marathon

packaging that sells food

"Visit Marathon's exhibit, booth 561, National Packaging Exposition, Atlantic City, N. J., April 1-4."

the Regular Whitecap...

IN 25 YEARS

...an 8-fold increase

1951

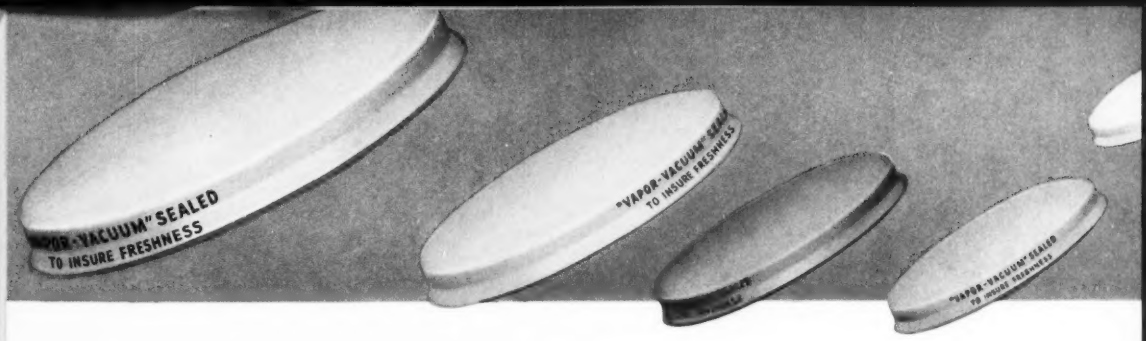
1926

Doubled, redoubled, and then doubled again! That's the story of glass packing in just 25 years!

Those 25 years are the years of the Whitecap ... the most powerful single influence in the modern growth of glass packing!

Pictured here are the types of food most commonly sealed with Regular Whitecaps. However, the uses of this cap extend over a considerably wider and growing range.

Note, also, that the products illustrated here do not always use this cap. Particularly when tumbler-packed, many of these foods use the Shallow Whitecap. Likewise, products in narrow-neck containers (not pictured here) have commonly used the Regular Whitecap, but are now generally using the Shallow Whitecap.



. . the cap that changed a nation's buying habits

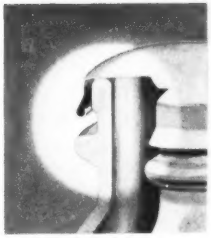
There are, today, 4 different types of Vapor-Vacuum closures, each with its own distinct design, function, and appearance.

But, of these 4, there is one which must always be given a special bow.

The *Regular Whitecap*, the basic cap of the Vapor-Vacuum line, is the closure from which all the famous Vapor-Vacuum Seals derive their existence. Its basic design is the foundation of all Vapor-Vacuum cap design. All the others are simply variations of this original cap.

To this one cap, therefore, must go most of the credit for bringing on the "Vapor-Vacuum Age", in which the glass packaging industry is now operating. When we say, "*This is the cap which changed a nation's buying habits*", we are simply stating an historical fact.

If it weren't for the Regular Whitecap, the modern glass packaging revolution could never have happened. *The coming of the high-speed production line, the present-day spread in the range of glass packed foods, the glass packaging of all those foods which need high pressure or high temperature processing—all this must be credited, first of all, to the influence of the Regular Whitecap.*



The little illustration just above shows exactly how the Regular Whitecap functions. This exceedingly simple design, plus the know-how which governs its application to so many widely varied packaging situations, is the heart of Vapor-Vacuum's strength . . . and still the key to the success of glass packaging, as of 1952!

"VAPOR-VACUUM" Seal and Re-Seal

PRODUCT OF **WHITE CAP COMPANY** CHICAGO

SELL AS YOU SHIP WITH RHEEMCOTE DRUMS

Rheemcote shipping containers are also **selling containers!** Beautifully lithographed in any colors, any design, they promote your product and name wherever they go. Use this powerful new advertising medium. Write—
Rheem Manufacturing Co.,
General Sales Offices,
570 Lexington Avenue,
New York 22, N. Y.

RHEEM

Manufacturing Plants in 22 Cities Around the World—PLANTS AND OFFICES: BAYONNE, LINDEN, NEW JERSEY • CHICAGO, ILLINOIS • HOUSTON, TEXAS • NEW ORLEANS, LOUISIANA • NEW YORK, N. Y. • NEWARK, RICHMOND, SAN FRANCISCO, SAN PABLO, SOUTHGATE, CALIF. • SPARROWS POINT, MARYLAND • FOREIGN PLANTS: BRISBANE, FREMANTLE, MELBOURNE, SYDNEY, AUSTRALIA • BRISTOL, ENGLAND BUENOS AIRES, ARGENTINA • HAMILTON, ONTARIO • LIMA, PERU • RIO DE JANEIRO, BRAZIL • SINGAPORE

(Advertisement)

Canned sour cherries show better storage life when packed in nitrogen. A major cherry canner reports in the January 1952 issue of FOOD ENGINEERING that jetting nitrogen into can headspace before sealing, works to preserve rich cherry color, protect live flavor, and aid in the retention of original vitamin content. (Reprints of this article are available from LINDE.)

Fat-fried foods such as potato chips and roasted nuts, keep crisp and flavorful when processed under nitrogen atmospheres. Blanketing of draining and cooling operations, package purging and breaking vacuums with nitrogen all serve to lengthen non-rancid shelf life of these products.

Roasted coffee is now pressure-packed under nitrogen in rigid containers. Purging cans prior to sealing, then sealing under nitrogen, reduces aroma losses, and protects fresh flavor by minimizing development of shelf life rancidity.

Canned fruit and vegetable juices and purees, when deaerated with nitrogen and packed under nitrogen atmospheres, have a longer shelf life. Higher Vitamin C levels are maintained, and can corrosion is minimized.

Dietary supplements, including synthetic Vitamin A, are produced and processed under nitrogen protection. Use of nitrogen purges, blankets, results in higher yields of a more potent material. In addition to these important results, reported in a recent article which is available in reprint form, the safety factor in handling highly flammable gases and solvents is improved by liberal use of nitrogen blanketing.

Edible oils and shortenings having longer non-rancid storage life, are the result of nitrogen break-back of deodorizer vacuum, nitrogen purges and blankets, and the use of nitrogen "fluffing". Storage and consumer containers are protected with nitrogen headspace atmospheres. (A recent report containing a flowsheet and suggestions on protection of edible oils with nitrogen, is now available from LINDE.)

Nitrogen protection is being accepted as standard practice in the processing of many foods which heretofore had relatively short shelf life. Employment of nitrogen has improved shelf life in many cases, in others it has protected color, flavor and vitamin content to greatly increase product sales appeal. Food producers and packers are invited to submit their inquiries to LINDE on the use of nitrogen for specific deterioration problems.

GET POSITIVE CONTROL OVER FOOD QUALITY

WITH Linde Trade-Mark HIGH PURITY NITROGEN

DURING PROCESSING

Blanketing against oxidative deterioration

Stripping entrained air

Drying or *Dehydration* free from oxidation

Blowing feed lines

DURING PACKAGING • STORING

Vacuum break-back before closure

Purging container free-space

Broad experience gained in applying inert nitrogen to a variety of processes shows that nitrogen protection helps preserve natural food color, flavor, and aroma, reduces vitamin losses sharply, and increases resistance to spoilage. This positive, threefold protection of food quality means greater sales appeal, and increased profit because of fewer quality rejects.

LINDE High Purity Nitrogen is supplied to the food industry as a gas in steel cylinders, or as a liquid in tank-car and tank-truck lots. Stored at your plant, the liquid can be converted to gas as needed, or used for lightning-fast cooling.

Call or write your nearest LINDE office today. Let us show you how to apply nitrogen profitably to *your* process.

LINDE AIR PRODUCTS COMPANY
A DIVISION OF UNION CARBIDE AND CARBON CORPORATION
30 E. 42nd St., New York 17, N. Y. Offices in Other Principal Cities
In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation

NATIONAL CAN *means* GOOD PACKAGING

The true value of your container source is best proven by the services they render in your plant. NATIONAL CAN supervises your entire packaging operation . . . this laboratory and technical service has been a major factor in establishing National Can as a preferred dependable source for many of the nation's leading packers. Why not discuss your packing operation with a National Can representative. Call or write, today!

NATIONAL CAN CORPORATION
110 EAST 42nd STREET, NEW YORK 17 N Y

Borden's made its flavor famous

ALCOA FOIL keeps it fresh!

It happened by accident. But from Emil Frey's fortunate discovery sixty years ago, came the formula for one of America's most famous cheeses—Liederkranz Brand, made only by The Borden Company.

No accident is the Liederkranz wrapper of sparkling Alcoa Aluminum Foil. Parchment-backed, for convenience and extra protection, it seals out harmful light, seals in the moist, creamy goodness and lusty robust flavor of this lordly cheese.

Alcoa, and its customers—the nation's leading packaging firms—are continually developing new ways to package many types of products better . . . in foil and foil laminates. For full information on possible applications and availabilities, just call your local Alcoa Sales Office, listed under "Aluminum" in your classified phone directory, or write: ALUMINUM COMPANY OF AMERICA, 1763C Gulf Building, Pittsburgh 19, Pennsylvania.

ALCOA
ALUMINUM

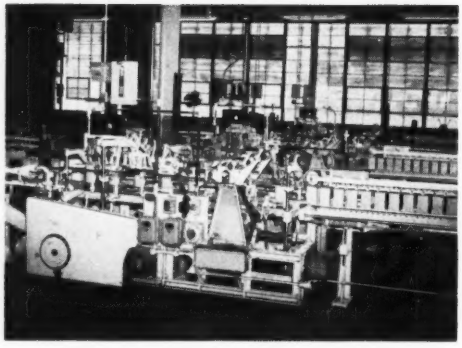
THE quick rise to popularity of prepared baking mixes called for fast action on the part of the producers. Varying densities and shortening content of mixes presented new problems in packaging.

Almost to a man the leading producers in that field met the crisis in the same way. They met it with Pneumatic equipment.

DUFF'S, for example, found Pneumatic machines to be ideally suited for their exacting "mix" packaging requirements — Double Package Maker units to produce a protective grease-proof carton, Cone Feed Weighers made for the job of feeding the different material smoothly and accurately into the container, and machines for top closing the lining and carton. DUFF'S went fur'ier — they installed Pneumatic tight wrapping machines for the application of outer labels to the entire package surface, for additional protection.

You, too, will find greater efficiency with Pneumatic machines — engineered to operate at "lower cost per container."

PNEUMATIC SCALE CORP., LTD., 91 Newport Avenue, Quincy 71, Mass. *Also: New York; Chicago; San Francisco; Los Angeles; Seattle; Leeds, England.*



Battery view of Pneumatic Top Closure Machines in operation at Duff's Baking Mix Division of American Home Foods, Inc., located at Hamilton, Ohio.

PNEUMATIC PACKAGING AND BOTTLING MACHINERY

Yours for the Asking

TO HELP YOU STORE AND HANDLE PACKAGING MATERIALS...

DOs AND DON'Ts
FOR STORING AND HANDLING YOUR PACKAGING MATERIALS
RIEGEL PAPER CORPORATION
1. Handy wall chart gives 12 "Do's and Don'ts" —hang it where it will be seen every day.
2. Plan for simple "build-your-own" humidified storage room to keep your packaging materials in top condition.

Riegel PAPER CORPORATION

• Functional Papers for Protective Packaging... Tailor-Made to Your Needs

RIEGEL PAPER CORPORATION
P. O. Box 170, Grand Central Station, New York 17, N. Y.

Gentlemen:

Please send me the following free aids for better storage and handling of packaging materials:

☐ "DO'S AND DON'TS" WALL CHART ☐ PLANS FOR HUMIDIFIED STORAGE ROOM

Signed _____ Title _____

Company _____

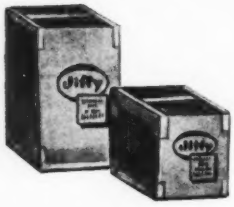
Street _____

City _____ Zone ____ State ____

Jiffy INSULATED BOXES and CARTONS

for ALL Food Shipments!

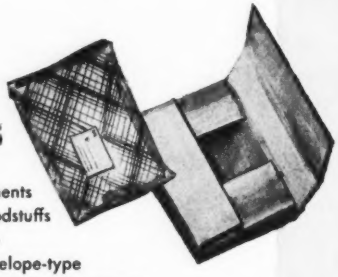
JIFFY insulating material is unique. It is easily recognized by its thick wall of insulation, its heavy outer cover of waterproofed kraft and its neat, clean appearance. Jiffy liners in boxes and cartons protect foods from temperature variations, inhibit dehydration and prevent outside moisture from damaging contents.



Jiffy INSULATED BOXES

. . . are ideal for all LCL shipments. They consist of a Jiffy Insulating Liner and a heavy Corrugated Box. For highly perishable items such as frozen foods or ice cream, where extremely low temperature must be maintained in transit, dry ice may be placed directly into the box, without damaging the box. Available in 8 standard sizes.

Jiffy INSULATED CARTONS



. . . are being used for single shipments of boxed chocolates or delicate foodstuffs which tend to crush or crumble. The Insulated Cartons consist of an envelope-type Jiffy Insulated Bag and an outer corrugated wrapper which forms a rigid container to prevent damage due to rough handling in transit.

For shipments of Laboratory samples, Salesman's samples or small orders where temperature or moisture control is needed, use JIFFY INSULATED BAG as an envelope. The thick insulation provides ample shipping protection to non-fragile items. Available in 8 sizes.

Use JIFFY Insulating and Moisture-Barrier Materials for bulk or single shipments of the following:

- MEAT
- POULTRY
- SAUSAGES
- BUTTER
- CHEESE
- ICE CREAM MIX
- ICE CREAM
- CHOCOLATE CANDIES
- CARAMELS
- MARSHMALLOW
- CANDIED OR CRYSTALLIZED FRUITS AND NUTS
- COCOA BUTTER
- SEA FOOD
- GRAIN PRODUCTS
- DRIED AND DEHYDRATED FRUITS AND VEGETABLES
- FRESH FRUITS AND VEGETABLES
- MACARONI, SPAGHETTI, ETC.
- BAKED PRODUCTS
- CATTLE OR POULTRY FEED

AND

ALL FROZEN FOODS

JIFFY Insulation is LOW IN COST

High in Performance.

Save foods from damage and spoilage in transit.

Write for samples and prices to:

INSULATED PACKAGING DIVISION

Jiffy MANUFACTURING COMPANY

360 FLORENCE AVE. HILLSIDE, N. J.

...FOR MOST ANY

Packaging Need!

Here is the most complete line of packaging machines . . . for packaging foods, chemicals, pharmaceuticals, candy, nuts—even small metal parts! Stokes & Smith machines, in both the packaging and paper box industries, assure neat-looking packages that stimulate consumer buying at point-of-sale. Write for complete information regarding your packaging requirements.

STOKES & SMITH Co

PAPER BOX MACHINERY — PACKAGING MACHINERY

Subsidiary of Food Machinery and Chemical Corporation

4911 Summerdale Ave. • Philadelphia 24 • Pa.

Exclusive West Coast Distributor

SIMPLEX PACKAGING MACHINERY, INC.

(subsidiary of FMC)

534 23rd Avenue ● Oakland 6, California

faster packaging, hairline register, and less waste!

SAVES WRAPPING MATERIAL!

At the Peter Cailler Kohler Swiss Chocolate Co. plant in Fulton, N. Y., Nestle chocolate bars are quickly wrapped in this packaging machine. Here, G-E cut-off register control has meant a big saving in wrapping material, plus an increased production rate, over the mechanical method previously used, which often wasted material through poor register and periodic jams.

G-E register controls—cut-off, side, and color—boost packaging speed, maintain pin-point accuracy, cut waste due to rejects!

In these days of self-service retailing, your product's "buy-appeal" is far greater when you package it in a neat, attractive wrapper—precision printed and cut with General Electric register controls. Automatic in operation, these electronic aids for food packaging also give you these advantages:

Increased production through automatic operation and higher machine speeds. *Lower material and labor costs* which often justify the equipment's entire cost. *Low maintenance* due to few moving parts, with automatically-maintained register eliminating need for constant visual inspection. *Easy operation* that requires no special training, enables operators to devote more time to other duties. *Maximum flexibility,* permitting controls to work equally well on paper, cellophane, metal foil, or cloth.

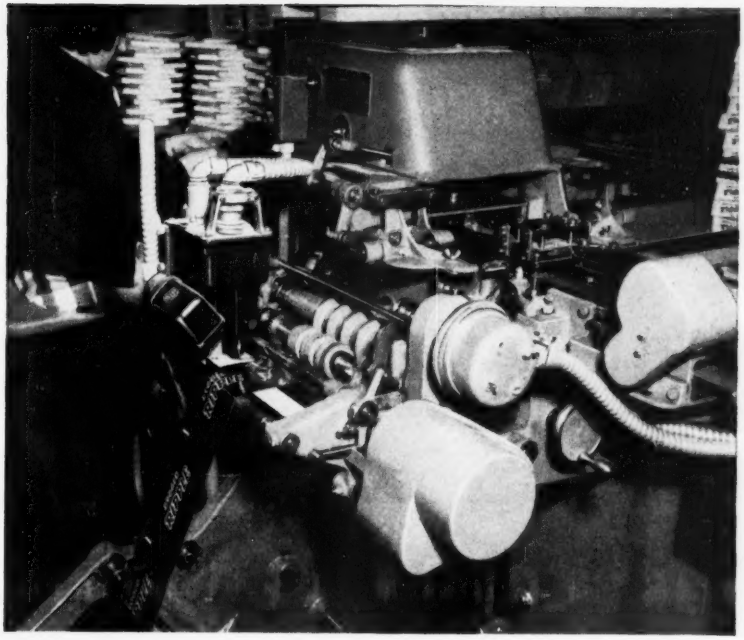
Use *cut-off register control* for your wrapping operations, *side-register control* for your slitters or wherever the web must be guided, and, if you do your own printing, *color-register control* for your web-fed gravure or offset presses. Ask your G-E food industry specialist how to apply these G-E register controls to boost output, cut costs in packaging *your* food products. Meanwhile, send for Bulletin GEA-4371A, *General Electric Company, Schenectady 5, N. Y.*

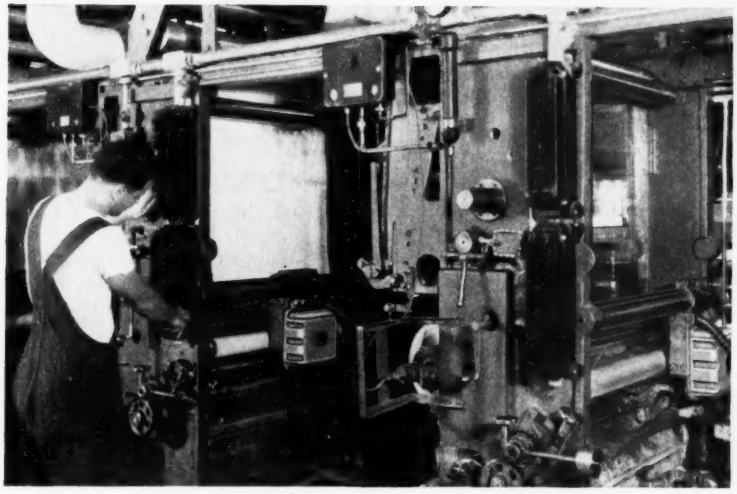
GENERAL ELECTRIC

652-7

SAVES MANHOURS!

Where eight people were once needed at the Golden Nugget Sweets, Ltd., plant in San Francisco to hand wrap and box candy bars, only two have been needed since the installation of a wrapping machine with G-E cut-off register control. Since register is maintained automatically, the control eliminates the need for constant visual inspection. Moreover, it permits wrapping as many as 115 candy bars per minute while cutting the preprinted paper roll to exact lengths and precisely positioning the printed design. Electronically controlled, this G-E device has few wearing parts, requires but little maintenance.



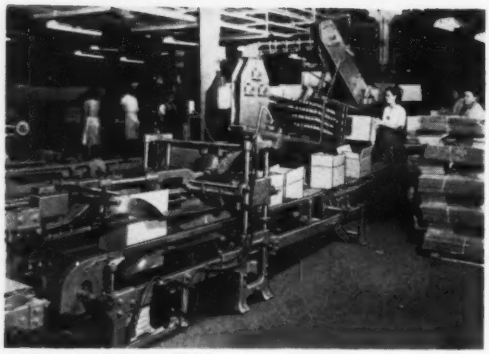


SAVES PRODUCTION TIME!

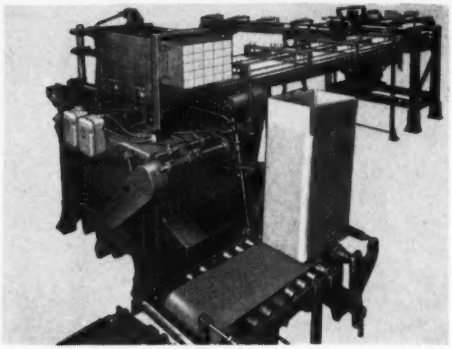
At Milprint, Inc., in Milwaukee, which prints multi-color wrappers on a continuous roll for use by food packers, G-E color-register control has permitted a substantial increase in press speeds. Close register is held on this rotogravure press even on such difficult materials as cellophane, pliofilm, and cellulose acetate. As a result, this company calculates the saving in rejects will more than pay for the G-E equipment within a year.

GE

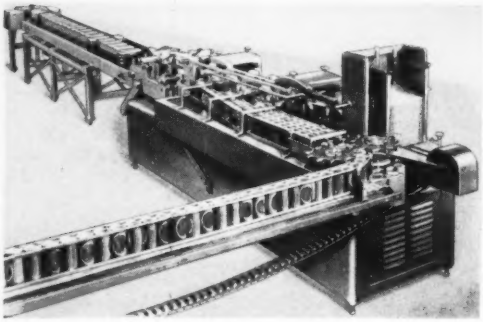
REGISTER CONTROLS for food packers

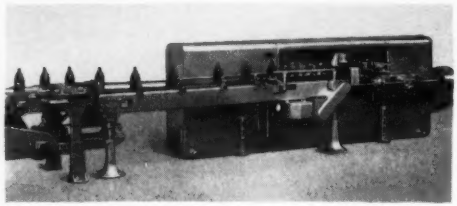


PACKAGING WITHOUT DAMAGE to cans, bottles, bags or cartons is assured on high speed Standard-Knapp Bottle and Can Packers.



PEAK EFFICIENCY is maintained on packaging lines in many fields with the aid of Standard-Knapp Collectors and Carton Packers.



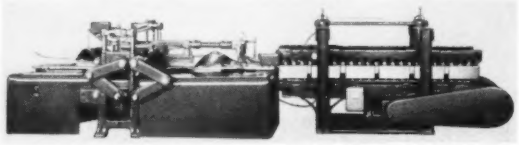


FOR CLEANING NEW BOTTLES, the H-E type Rinser handles each unit individually. Standard-Knapp machines are automatically preferred for automatic packaging.

FOR MULTIPLE PACK CARTONING of flat or cone top cans, this machine sets up cartons, loads them, then glues and seals them.

Automatic Packaging that Stands Up to Constant Operation

You get precisely the line speed you want with Standard-Knapp packaging machinery, but that's only part of the story. Just as important, you get durable performance — the month after month production — that keeps your cost curve going down. Durability is an inherent design characteristic in Standard-Knapp automatic packaging machines — put it to work for you.



NEAT SHIPPING CASES, firmly glued and sealed, are delivered at high speed by Standard-Knapp Gluers and Sealers.

STANDARD-KNAPP

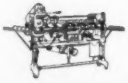
Division of Emhart Mfg. Co.

PORTLAND, CONNECTICUT

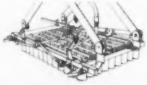
Only the best is good enough

UNLOADERS and CONVERGERS

UNSCRAMBLERS and DUMPERS

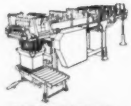


LABELERS



PALLETIZERS

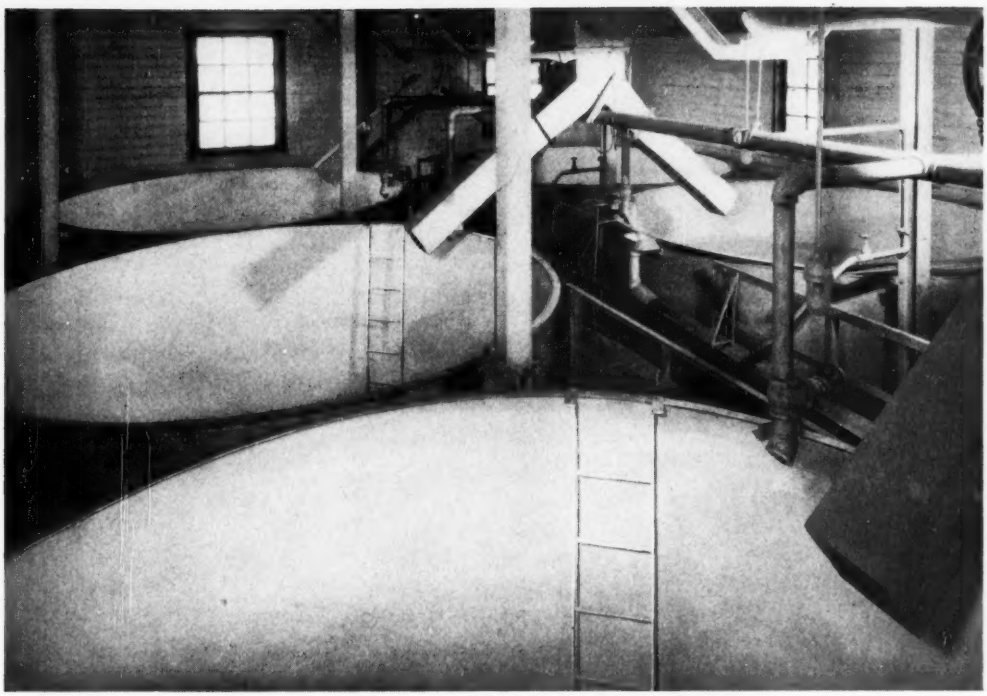
CAN PACKERS and BOOSTERS



BOTTLE PACKERS and CASE PRINTERS

RINSERS

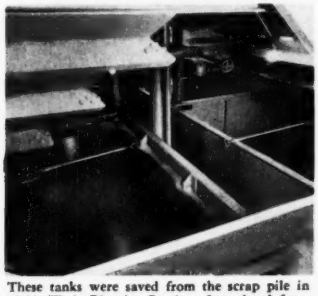
FOR: FOODS • PHARMACEUTICALS and COSMETICS • BEVERAGES • SOAPS and CHEMICALS • TEXTILE PRODUCTS
PAPER PRODUCTS • OILS • TOBACCO PRODUCTS • APPLIANCES • METAL PRODUCTS • PAINTS



No Corrosion...No Wear in FIVE YEARS

MOLD AND FUNGUS are the arch-enemies of paint films and tank linings throughout the food industry. In the malting industry, millions of bushels of grain and mineral waters cause additional abrasion and corrosion. Ordinary paint films last only three or four months.

In 1947, the grain steep tanks shown above were coated with materials formulated with VINYLITE Brand Resins. *Not a cent* has been spent on maintenance, and there's *still* no evidence of paint deterioration!



These tanks were saved from the scrap pile in 1944. Their Bisonite Coating, formulated from VINYLITE Brand Resins, stopped deterioration completely and have remained intact for years.

Five tough years compared with four months—proof of the ability of coatings based on VINYLITE Brand Resins to do a superior job under tough conditions.

Similar paints based on VINYLITE Resins can give such protection to your plant or product. *Properly formulated, properly applied* by dip, brush or spray, they resist most chemicals, corrosive atmospheres, oil and water. Likewise, they protect contents from container contamination, for they dry quickly to an odorless, tasteless, non-toxic finish.

Applied to metal, concrete, or masonry, they strongly resist abrasion, impact and thermal shock, are non-flammable, and may be scrubbed repeatedly without losing color or texture. Their wide range of colors includes flat, semi-luster and glossy finishes. Paints formulated from VINYLITE Brand Resins have the unique qualities that make these resins so useful for scores of products in defense and basic industry.

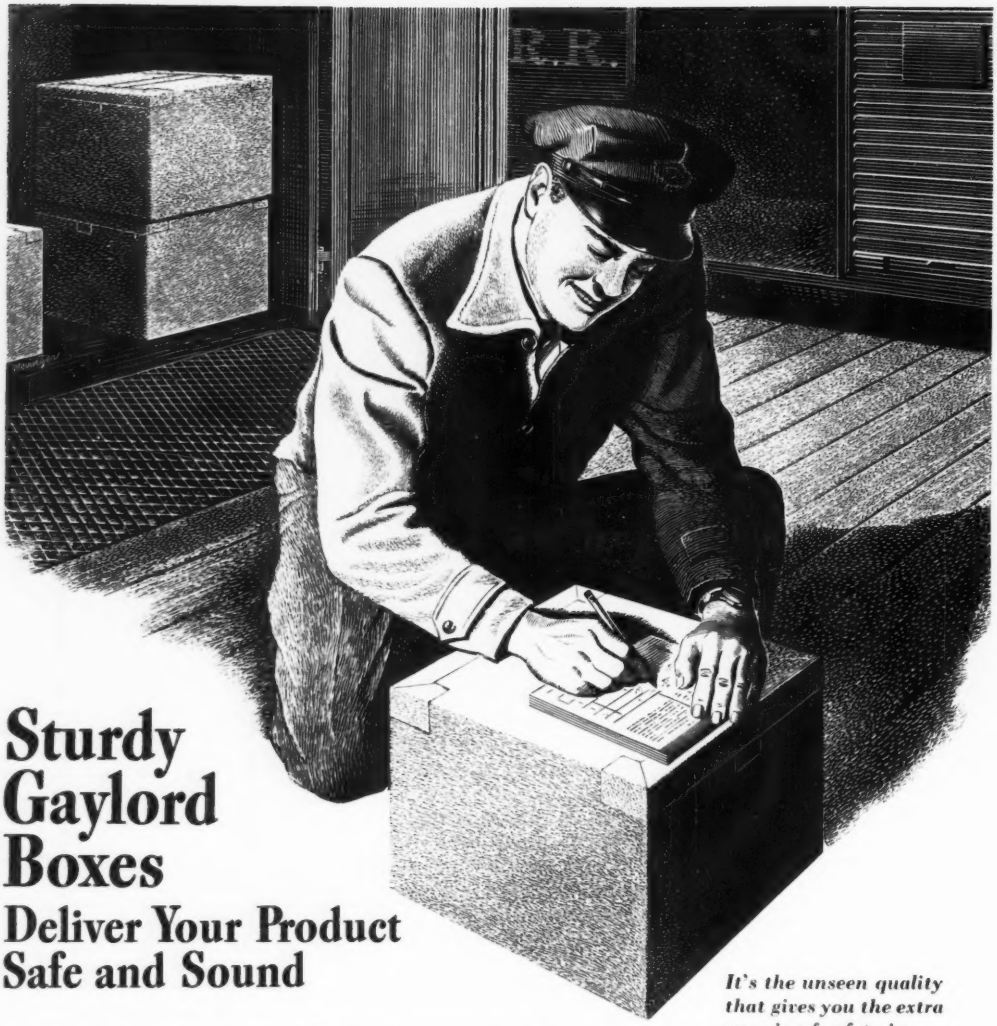
Let us send you more information about these coatings and data on sources of supply. Write Dept. MH-74.

The coatings used on the tanks shown here were manufactured by the Bisonite Company, Inc., 128 Lakeview Ave., Buffalo 1, New York.

Vinylite
BRAND
RESINS

TRADE MARK

BAKELITE COMPANY
A Division of
Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N.Y.



Sturdy Gaylord Boxes

Deliver Your Product Safe and Sound

It's the unseen quality that gives you the extra margin of safety in

Gaylord Boxes

Manufacturers who know the sales value and economy of safer arrival of their products prefer Gaylord Boxes.

Tough enough to take the roughest kind of handling, these protective containers stand between your product and possible damage in shipping.

Ask the Gaylord Sales and Service office nearest you for proof of the advantages of Gaylord Boxes engineered to your specific needs.

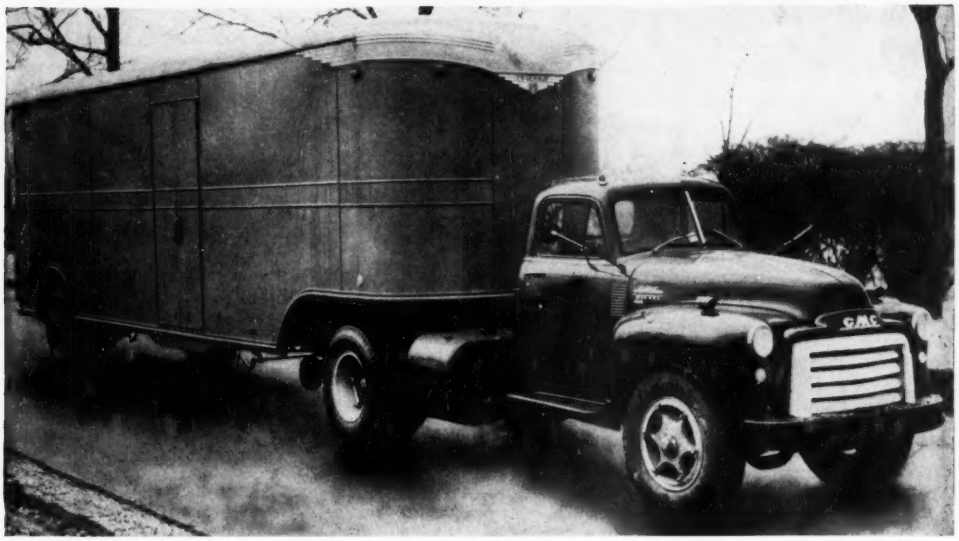
GAYLORD CONTAINER CORPORATION

General Offices: ST. LOUIS

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT BAGS AND SACKS • KRAFT PAPER AND SPECIALTIES

New York • Chicago • San Francisco • Atlanta • New Orleans • Jersey City • Seattle • Indianapolis • Houston • Los Angeles • Oakland • Minneapolis • Detroit • Columbus Fort Worth • Tampa • Dallas • Cincinnati • Des Moines • Oklahoma City • Portland • Greenville • St. Louis • San Antonio • Memphis • Kansas City • Bogalusa • Chattanooga Milwaukee • Weslaco • New Haven • Amarillo • Appleton • Hickory • Greensboro • Sumter • Jackson • Miami • Omaha • Mobile • Philadelphia • Little Rock • Charlotte • Cleveland

NEW EQUIPMENT & SUPPLIES



Diesel Trucks Enter Medium-Weight Field

Smallest and lightest Diesel truck ever commercialized for use on the American highways is this GMC 3-cylinder, 2½-ton unit, seen bringing a new era of economy and efficiency to truckers in the medium-weight field.

This model is for operators using either trucks in the 19,500 lb. gross vehicle weight class or highway tractors in the 35,000 lb. gross combined weight class. Maker figures the new power-plant will quadruple the potential use. New truck, rated at 110 hp., is being produced in five wheelbases for either truck or highway tractor models.

As a tractor, it is stated to meet the demand for improved operating economy, durability, and service life of equipment. It is termed suitable not only for regular inter-city work but also intra-city hauls of relatively high mileages.

A test run was made from Wichita to Los Angeles and return with one of the new trucks competing against a standard gasoline-powered truck of the same size characteristics. Carrying a 35,000 lb. capacity load, the Diesel reportedly turned in 27 percent more miles per gallon and a 31 percent saving in fuel dollars.

Like the larger "71" series engines, the new 3-71, as it is designated, employs direct fuel injection. A Roots type blower, forces in air through ports at the lower end of the cylinder, swirling spent gases out via the twin exhaust valves, and forming the air charge for the next injection of fuel. Individual injectors at each of the three cylinders meter and atomize the fuel under high pressure into the combustion chamber.

Compression ignition of the fuel spray and the resultant power stroke complete the two-cycles. Producing one power stroke per cylinder for each revolution of the crankshaft, two-cycle power gives the equivalent of twice the number of cylinders as a four-cycle engine.

Maintenance Benefits Cited

Important feature is the high degree of parts interchangeability between all series "71" engines. Among the numerous common parts are cylinder liners, pistons, piston rings, connecting rods, main and connecting rod bearings, valves and fuel injectors. Fleet operators thus may gain simplified maintenance and reduced parts inventories.

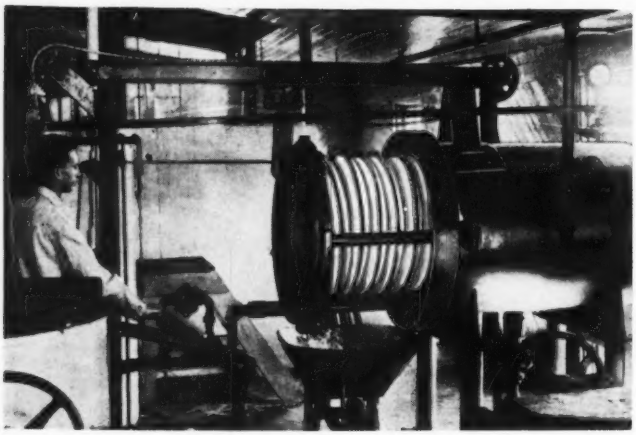
The brake system of the new unit combines air actuation with the advantages of dual-cylinder hydraulic brakes at front and rear. Heart of the system is an air-hydraulic unit that changes air pressure into hydraulic pressure by means of two direct-connected pistons. Brake control is through the customary foot pedal and hydraulic master cylinder, which operates the air control valve, thus regulating pressure on the air piston and hydraulic slave cylinder.

Air system comprises an engine-mounted compressor of 7¼ cu. ft. capacity, pressure governor, and two air tanks. Trailer air brake connections and hand control valve are available for tractors.

Shift control on two speed-axle equipped models is the new electrically operated mechanism. Axle control plunger button is conveniently mounted on the transmission gearshift lever. Movement of the button up or down controls electric current to the motorized axle shift unit. Described as particularly important in hilly operations is the quick, positive control independent of vacuum or air supply systems.—*General Motors Co., Truck & Coach Div., Pontiac, Mich.*

Circle 115A on Reader Service Card

Filter Cuts Cleaning Time, Steps Up Yield



This new horizontal pressure-leaf filter is stated to reduce cleaning time and labor to a minimum. Moreover, several times higher output from press is claimed.

It is intended for filtration jobs where large volumes of solids must be recovered or discharged, as with vegetable oils.

Filter does not employ cloth. It consists of a horizontal tank containing a retractable carriage on which stainless steel leaves are vertically mounted. Leaves are quickly accessible for cleaning when operator actuates a windlass and monorail assembly that is an integral part of filter. This assembly may be hand operated or motorized.

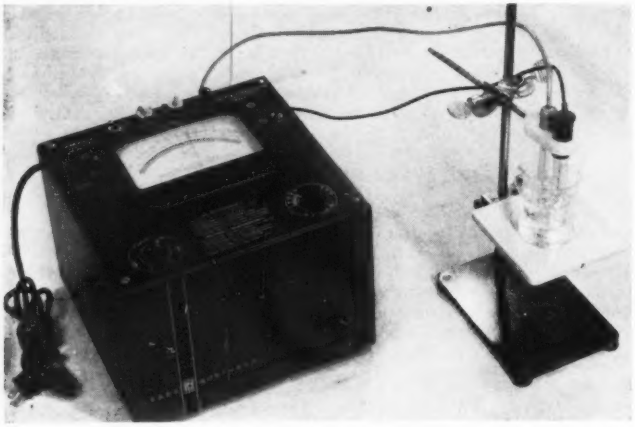
Carriage rolls out of tank as a single unit, and cake is quickly separated from leaves by rapping leaves with a rubber mallet. Semi-dry cake drops into a hopper, trough, or wheelbarrow for recovery or disposal. Entire cleaning operation for large unit is said to take only a few minutes.

Filter is reported so simple that one man can handle a battery of them. New design also incorporates a special cover which quickly locks and unlocks with one motion, eliminating such devices as handwheels and eyebolts.

Tank is all-welded steel and of leakproof construction. It may be steam-jacketed for high-temperature operation. Sizes affording capacities up to 150 cu. ft. of cake are available, with flow rates up to 1,000 gpm.—*Niagara Filter Corp., Buffalo, N. Y.*

Circle 116A on Reader Service Card

pH Indicator Unaffected by Voltage Fluctuations



Normal fluctuations in line voltage or zero drift of amplifier are stated to have no effect on this new line-operated pH indicator and vacuum tube voltmeter.

A converter-type instrument, it incorporates a circuit employing d.c.-to-a.c. conversion, a.c. amplification, and conversion again to d.c. for voltage feedback. Conversion stabilizes zero; feedback stabilizes the gain.

Used as an indicator, the instrument reads directly in pH, making glass-electrode measurements to within ±0.02 pH on grounded or ungrounded solutions. Continuous 0-to-14 pH scale on this instrument eliminates range-changing.

For manual use in the laboratory, temperature compensator is graduated from 0 to 100 C. in 2 deg. steps. If instrument is used as a continuous pH indicator on an industrial process, automatic temperature compensation can be provided.

As a vacuum tube voltmeter, this new unit can be used with any high or low impedance electrode system that develops potentials within range of the instrument. External circuits can have up to 2,000 megohms resistance. Current drain does not exceed 1×10^{-12} amp. at null balance. Four additional millivolt scales (0 to +700, 0 to −700, 0 to +1,400, and 0 to −1,400) are available for redox, potential, and polarized current measurements.

Built for hard use, instrument is enclosed in a sturdy, modern case made of gray-enameled aluminum. Instructions for making pH and millivolt measurements are inscribed on panel.—*Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Penna.*

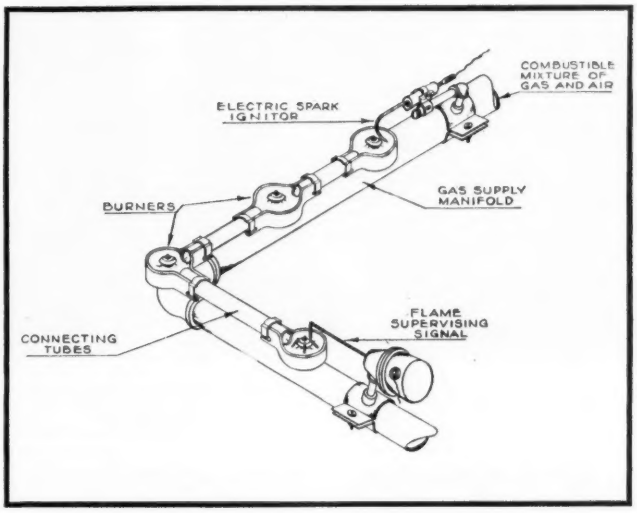
Circle 116B on Reader Service Card

Gas Ignition System Is Positive and Safe

A recently developed system for igniting gas-fired radiant-heat burners is stated to assure positive action and new safety.

Burners, arranged in series upon a gas supply manifold, are ignited at one end by an electric spark when operator depresses a pushbutton. The closed circuit also energizes the automatic gas supply valve at the same instant, permitting gas to reach all of the burners by means of the supply manifold and connecting tubes.

A flame-supervising device is located at last burner of series, at end opposite spark ignitor. If its contacts are not closed by flame in ignited gas burner after pushbutton is released, supply valve will close automatically, shutting off gas from all burners. But if supervising-device contacts are closed, as normal, then supply valve will remain open, energized by current received through supervising-device circuit.—*Burdett Mfg. Co., 3433 West Madison St., Chicago 24.*



Circle 117A on Reader Service Card

Device Simplifies, Speeds Drum Handling

This new horizontal drum-handling device is designed for attachment to any industrial fork truck without removing the forks or making any hydraulic or mechanical connections. Completely automatic, new device is a self-contained unit fitting over the forks. It is fixed to them with two screw-type clamps.

One or two standard drums can be picked up with the handler by simply lowering it over them while the truck is slowly backing away. Spring loaded rear clamps snap under lip of drum. When drums are lifted, gravity action locks clamping hooks in place. There is no load on the springs at any time.

Depositing the drums is reported to be as easy as picking them up. Drums are lowered, truck is moved forward (stretching springs on rear clamps), and as soon as the forward clamps are free, channels on truck are tilted back. Truck is then backed away to free rear clamps.

Despite simplicity, handler is cited as safe. Maker states loads will not drop with sudden stops, when traveling over a rough surface, or when truck channels are tilted.

Weighing 270 lb., attachment accommodates drums filled with any common material. Drums may be stacked to any height within lifting range of truck.—*The Yale & Towne Mfg. Co.,* 11,000 *Roosevelt Blvd., Philadelphia* 15.

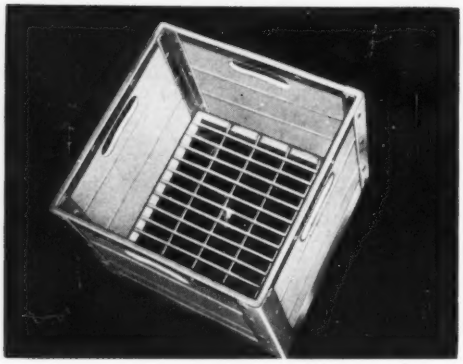
Circle 117B on Reader Service Card

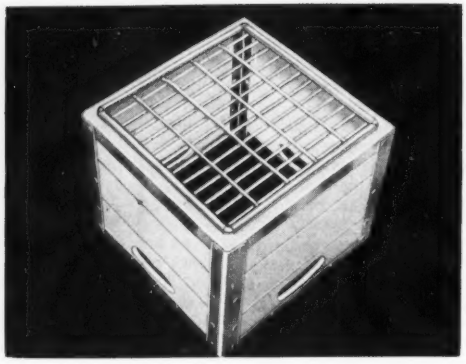
Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard just inside the back cover. Then sign at the bottom and mail. No postage is needed.

For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.

New Crate Incorporates Features Which Protect Paper Bottles





Losses in paper bottle handling are reported reduced when this new crate is used. Design advances are stated to eliminate tearing, crushing, denting, and marring of paper containers.

Interior of crate is completely finished. Corners of both side and end slats are chamfered before assembly. Thus, there are no sharp edges or offsets to rub the parafined surface of paper bottles.

The four inside corners of crate are recessed, avoiding actual contact of paper-bottle corners with sharp metal angle surfaces. As a result, minimum effort is required to load crates. Cocking or binding of bottles while loading is stated eliminated, it being unnecessary to force bottles to fit.

Bottles are reported not affected by rough crate handling, since there are no internal pressure points that might mar surfaces of the individual paper cartons.

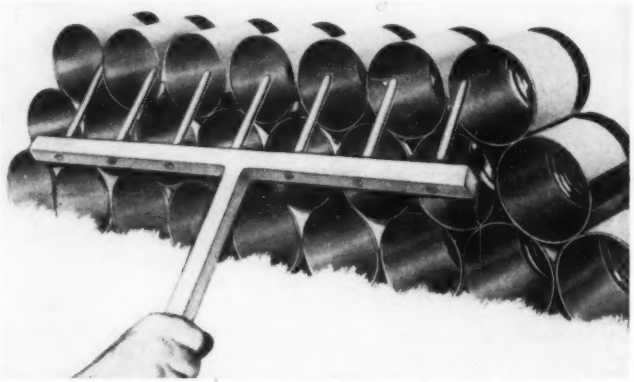
Metal crate bottom is fabricated as a complete unit, then assembled to crate frame. Heavy gage flat wires are equally spaced on mild steel cross rods and are spot welded into place for strength and rigidity.

Grid formed by intersecting wires and rods is then welded to bottom side and end angles. Bottom sides of these angles are formed around, and supported by, a $\frac{7}{8}$-in.-dia steel rod. This structural member serves a double purpose. First, it raises crate approximately ½ in. off floor, thus preventing possible damage to bottom of bottles. Second, it eliminates need for stacking irons, thus simplifying crate stacking and handling.

All metal used in the crate is rustproofed and heavily galvanized. And cleaning of crate is termed simple. There are two models to handle 16 and 20 quart-size paper bottles. They can also be used for ½ gal. bottles as well as the 1 pt. and ½ pt. cartons.—*The Quirk Crate & Cabinet Co., Cudahy, Wis.*

Circle 118A on Reader Service Card

Lightweight Can Fork Made of Magnesium



TINES are non-rusting and individually replaceable on this new can fork. Made of magnesium, new unit combines lightness with strength and service-ability in a design aimed to speed can handling operations by reducing lifting effort.—*Magline, Inc., Pinconning, Mich.*

Circle 118B on Reader Service Card

Greenish-Tint Glass Cuts Solar Heat

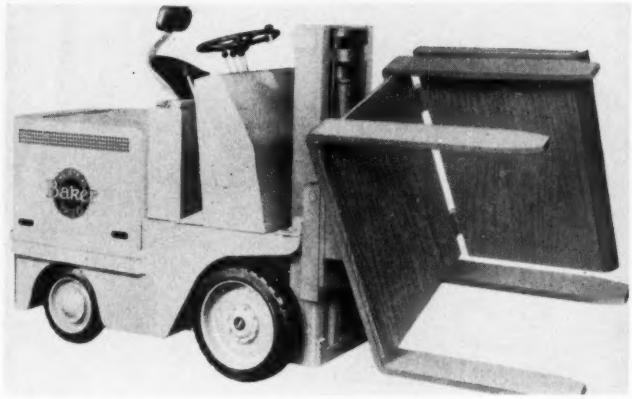
Newest product offered by the flat glass industry is a greenish-tint glass which absorbs the sun's heat, thus reduces eye strain and holds fading and bleaching to a minimum. Where perishables are displayed, it is stated to prevent deterioration.

New product, called "Solex", reportedly may be bent, laminated or tempered for use in practically any type of flat glass application. It is said to take the heat out of sunshine but not to sacrifice light transmission.

Solex principle is absorption of the red portion of the solar spectrum so that remaining light transmitted is easier on the eyes and on materials. A room glazed with the tinted glass is reported 10 to 20 deg. F. cooler than one with windows of ordinary glass.—*Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh.*

Circle 118C on Reader Service Card

Attachment Simplifies Inverting Unit-Loads



Specifically developed for use in dairy food plants, this new load inverter is reported adaptable to any operation requiring regular inversion of palletized loads.

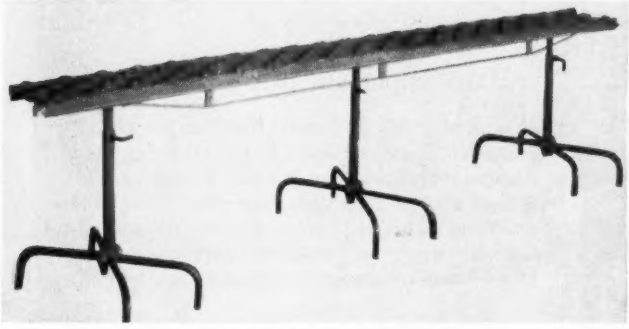
Object is to provide a method of turning unit loads quickly without taking them from pallets. This inversion is essential to certain foods processors to interrupt natural settling.

Attachment consists of a revolving head and a set of top-and-bottom forks, with a plywood backstop and a side retaining board. To turn a load, operator moves his truck with attachment positioned so that plywood retainer is in a vertical position. An empty pallet is carried on top forks of attachment. After lifting load out of its storage spot, operator turns the load 180 deg., using the revolving head.

As the load revolves, it is kept in position by retaining board until it has made the turn. When completed, the inverted load shifts to empty pallet and is put back in storage.—*Baker Industrial Truck Div., The Baker-Raulang Co., 1250 W. 80th St., Cleveland 2.*

Circle 119A on Reader Service Card

Lightweight Conveyor Takes Heavy Loads



This 12-in. wide, heavy duty Load-Veyor is made in 5-ft. and 10-ft. sections with 45- and 90-deg. curves to suit special and individual needs. It is termed exceptionally light in weight.

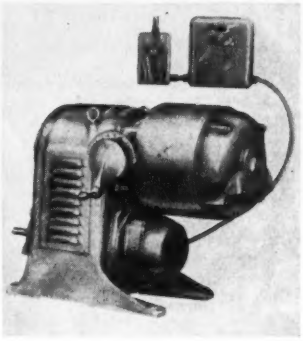
Extra strength and durability is stated provided by use of tension members without the addition of unnecessary weight. A 10-ft. section weighs 69 lb. Standard arrangement is with wheels set above side channels.

Load-Veyors are rated to take loads of 1,000 lb. covering surface of conveyor, and individual loads up to 300 lb. per unit.

Ball-bearing wheels of 2-in. dia. and 5/8 in. wide are spaced on slightly less than 3-in. centers. Unit is available with welded-on connectors which are inter-connectable with the majority of other wheel conveyors of the same size. It can also be supplied with removable type connectors.

Side members are joined by inverted angles welded to both channels. There is one (angle) at each end and one in center of 10-ft. section. These angles strengthen the frame.—*Market Forge Co., Materials Handling Div., Everett 49, Mass.*

Circle 119B on Reader Service Card



Motor Brake Mounted On Vari-Speed Shaft

Fast, controlled braking of Varidrive motors is now possible through a Warner type ICB brake which, mounted directly on the variable speed shaft, eliminates transmission of stopping action through the belt.

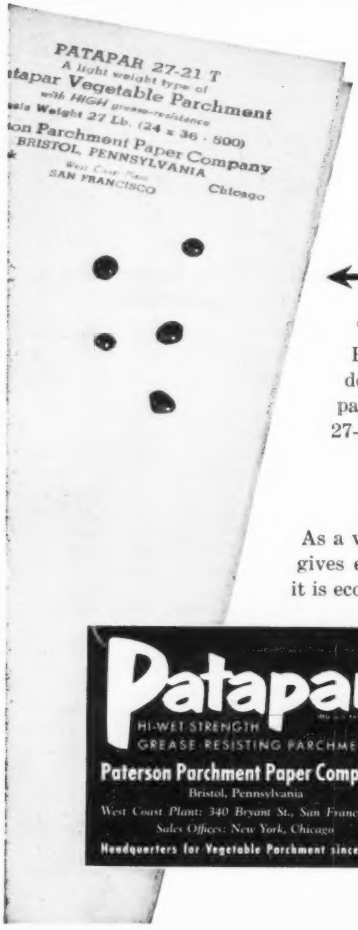
Stated ideal for inching or jogging, unit offers shockless operation without noise and produces a constantly increasing torque during stopping. It contains few parts, has a mechanical movement of only 1/16-in, and direct control of frictional force is possible through brake.

Adjusted with accuracy, the braking torque once set is permanent. For installations requiring diversified braking torques, adjustment is easily made through a knob-controlled rheostat. Designed to dissipate a high rate of heat, the unit is reported to insure stability of operation with long, safe and trouble-free service.

Brake is d.c. actuated with low power requirements—maximum 25-35w. Power conversion units are used where a.c. voltage is supplied.—*U. S. Electrical Motors, Inc.,* 200 *E. Slauson Ave., Los Angeles* 54.

Circle 119C on Reader Service Card

NEW! PATAPAR 27-21T
light in weight . . .
. . . high in grease-resistance



Patapar 27-21T is a new type of Patapar Vegetable Parchment that is light in weight (27-lb) and – in addition to wet-strength – *extremely grease-resistant*. In actual commercial use, Patapar 27-21T has shown greater resistance to grease and oil penetration than conventional grease-resisting papers of much heavier weight. It offers improved packaging at lower cost.

← NO GREASE "crawl"

This test will prove it. Place 5 drops of oil on a sheet of Patapar 27-21T. The drops will not increase in size. They do not spread or "crawl." On a conventional grease-resisting paper the oil drops will crawl and spread noticeably. Patapar 27-21T stops grease "crawl" *completely*.

Many important uses

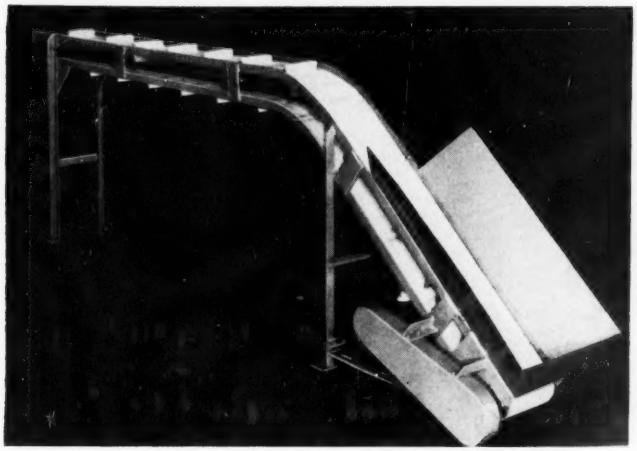
As a wrapper for lard, shortening or margarine Patapar 27-21T gives excellent protection. It stays clean – looks appetizing. And it is economical. Because it resists grease staining, Patapar 27-21T is used also as a package insert for coffee, nuts and other oil bearing products. It is ideal as a protective wrapper for oiled metal parts and leather goods. These are just a few of its many applications.

Patapar
HI-WET STRENGTH
GREASE-RESISTING PARCHMENT
Paterson Parchment Paper Company
Bristol, Pennsylvania
West Coast Plant: 340 Bryant St., San Francisco 7
Sales Offices: New York, Chicago
Headquarters for Vegetable Parchment since 1885

Send for samples

For samples of Patapar 27-21T and more information, write us today. Tell us the use you may have in mind.

For Moving Lightweight Items



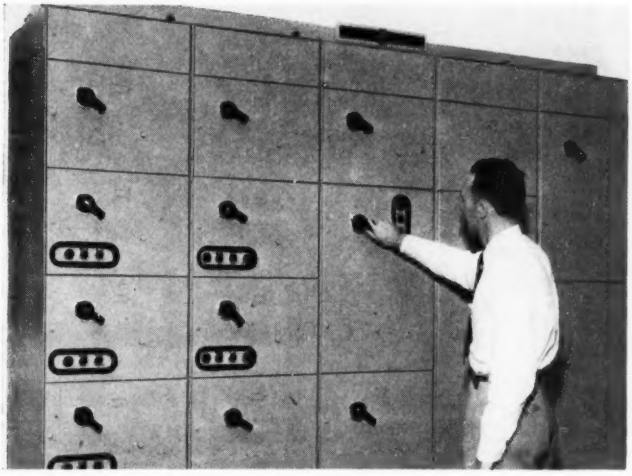
Small, light materials or packages are readily handled by this mover.

Unit is recommended for use at dispensing end of packaging machine, to transport items to location of boxing operation. Conveyor belt is of woven fabric, easy to maintain. Lugs are of washable canvas. A ¼-hp. motor drives unit. Framework is of light structural steel and drive is shielded.

Flexible design permits variations in lengths and other respects as required by products to be moved. Speed of conveyor can be adjusted by changing sprockets on motor. If desired, variable speed drive can be incorporated.—*The Klass Machine & Mfg. Co., 4329 East 49th St., Cleveland, 25.*

Circle 121A on Reader Service Card

Motor Control Center Is Simply Installed



A completely new motor control center is announced for use wherever two or more a.c. motors (up to 200 hp., 600v.) are controlled from a single location.

Factory wired and assembled, the new center incorporates many standard components and accessories. It was developed for use in food plants as well as in other factories.

According to the maker's engineers, it provides a simplified method of installing and servicing, in a central location, a.c. combination motor starters in NEMA sizes 1 through 5, as well as lighting panels and associated equipment for a group of motors.

Center is designed to withstand short circuit stresses up to 25,000 amp. Its sections, each measuring 20-in. deep, 20-in. wide, and 90-in. high, join to form a strong, free-standing, dead-front, enclosed, control assembly.

I-beam construction and full-length floor sills of the rust-resistant steel enclosure are designed to give a rigid center easily placed in position by means of a lifting angle.

One of the main features is a 4-in. vertical trough (with cable supports) running the full length of each section and providing ample space for wiring. No "threading through" or "fishing" is necessary because metal barriers separating starter units are easily removed, leaving a continuous wiring trough.

Inspection and servicing of starter units is simplified because units are easily removable, also all components—including pilot devices—are mounted on lightweight unit frame. Starter unit replacement is facilitated by positive-action positioning guides that assure correct alignment of starter to vertical bus. To protect personnel, a full length metal barrier separates the bus compartment from the starter units.

Units may be installed from the front or rear of section and are designed in even multiples of 14 (height of NEMA size 1 and 2 is 14 in.) enabling a variety of arrangements and providing easy interchangeability. —*General Electric Co., Schenectady 5.*

Circle 121B on Reader Service Card

New Electric Tachometer for Vari-Speed Drives

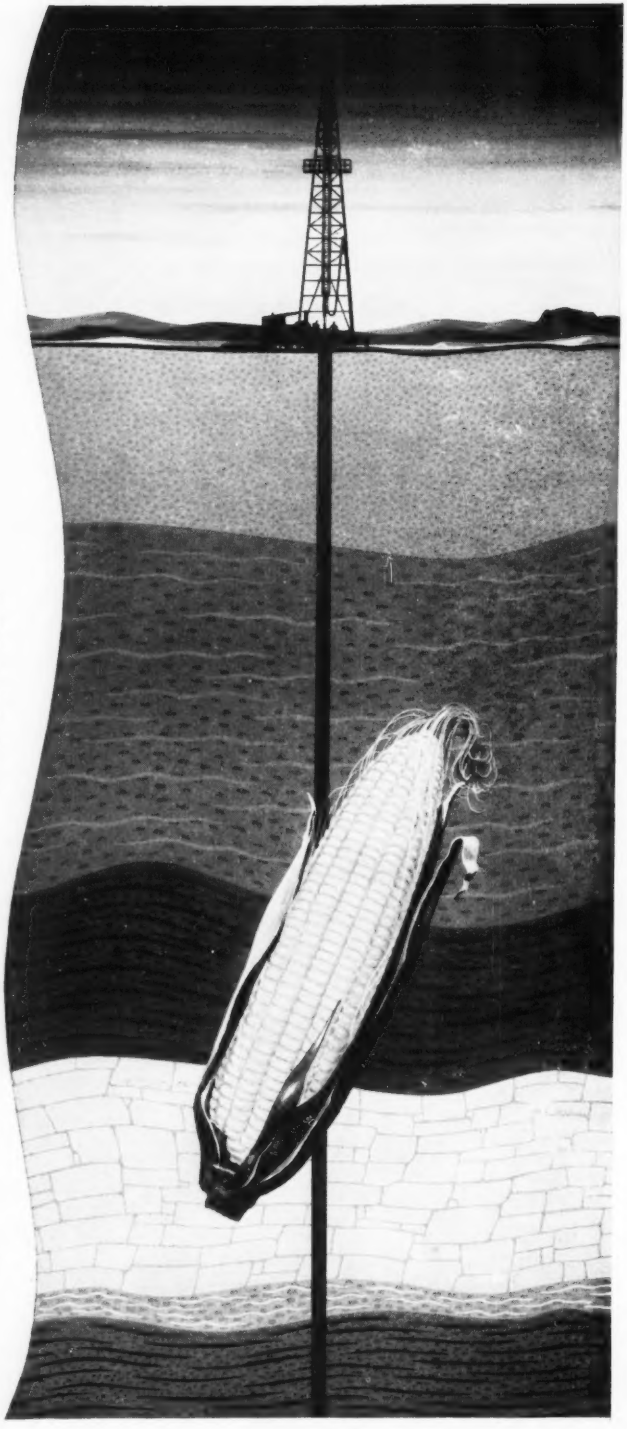
A new electric tachometer has been designed for use with variable speed drives when they must be mounted in inaccessible or remote locations.

This unit, says maker, gives new accuracy, yet is economical. It operates on the a.c. generator principle, and aim was to allow more flexibility in installation, since the indicator may be mounted as far as 300 ft. from the variable speed drive.

Design is for quick and easy mounting on drives already in service in capacities from ¼ to 87 hp.—*Reeves Pulley Co., Columbus, Ind.*

Circle 121C on Reader Service Card

What's corn doing "deep in the heart of Texas"?



Research discovered that drilling for oil could be expedited by the use of a binding agent made of a product of corn. This firmed up the side walls... also aided in the early flow of sludge. "Black gold" speeded by yellow corn! This is but one of the numerous examples of how continuous basic research in corn helps American industry... helps you.

Corn products in food

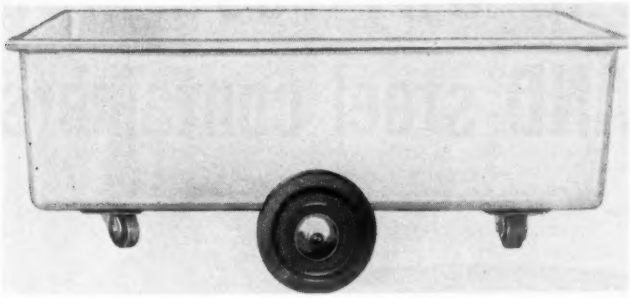
In the food field highest quality dextrose, regular and high-conversion corn syrups and superior starches are recommended ingredients for many processing formulas. New techniques involving the use of corn products are being developed as part of a continuing research program at Corn Products Refining Company.

If you have a production problem why not check with Corn Products? A complete line of corn products for every purpose is available. Technical service is yours... no obligation, of course.

CORN PRODUCTS REFINING COMPANY
17 Battery Place, New York 4, N. Y.
Manufacturers of

CERELOSE brand dextrose • **PURITOSE** brand corn syrup • **GLOBE** brand corn syrup
BUFFALO starch • **HUDSON RIVER** starch

Aluminum Dough Trough Is Light, Easy to Clean



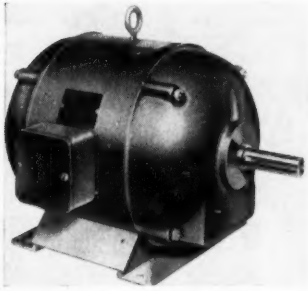
This new aluminum dough trough, fitted for handling pie fillings and dough, is easy to handle and clean due to its light weight.

Body is of strong aluminum alloy of high tensile strength. Constructed with welds on the inside, ground smooth, without seams or crevices, it is designed for good sanitation. Each corner is reinforced by a special aluminum casting with a heavy weld underneath the flanged edge to strengthen it.

Understructure is tied to truck body with a continuous weld. New type roller bearing St. John Neotread wheels, equipped with Zerk type fittings, are used to permit lubrication within the bearings. Capacity of truck is 14 cu. ft. Inside dimensions: Top length 60-in., top width 26-in., and depth, 17½-in.—*The Aluminum Cooking Utensil Co., New Kensington, Pa.*

Circle 123A on Reader Service Card

Expands Motor Line to 125 Hp. Rating



Addition of four frame sizes has now expanded the R&M line of standard motors to include 125 hp. ratings. Highest previous rating had been 50 hp.

The new sizes are designed for all-weather operation, with special treatment to resist moisture and corrosion. All steel parts have a baked-on, rust-resisting undercoating. Rotor assembly is treated with a rust-inhibitor, and cast-iron end-heads and terminal box are given an anti-corrosion treatment of zinc chromate. Power lead-ins are sealed at motor shell with a non-hardening compound.

Extra-wide, pre-lubricated ball bearings containing special greases to resist adverse conditions of dust, temperature, humidity, and speed. Under normal operating conditions, bearings will not require lubrication for at least five years, says maker.

Extra insulation for coils is designed to increase protection. Coils are covered with a moisture-resistant, synthetic resin and tung oil sealer, and winding is pre-heated, dipped in synthetic resin-base varnish, and baked.

End-to-end "clean sweep" ventilation is intended to eliminate converging air currents that deposit dirt. Auxiliary air passages in rotor core assembly enable air to circulate through rotor as well as between windings and shell.

New-rating units are in NEMA frames 444, 445, 504, and 505.—*Industrial Motor Div., Robbins & Meyers, Inc., Springfield 99, Ohio.*

Circle 123B on Reader Service Card

Compressed Air Cleaned By Separator Unit

Machine oils, moisture, and solid impurities commonly carried by compressed air are prevented from reaching food products or ingredients by removal at their source through the use of new aftercooler-separator units.

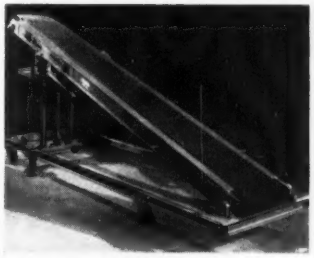
These units dehydrate and clean the air before it enters the distribution piping. Further, accuracy of air pressure gages and other instruments is likewise promoted by clean, dry air.

The shell and tube aftercooler employs the counterflow principle to reduce air temperature to within a few degrees of the cooling water. Condensed moisture and oil, as well as other foreign particles, are then subjected to the cyclonic action of separator.

Air leaving the unit (with very little drop in pressure) cannot condense further, since its temperature has been brought below that of the surrounding air. A special chamber provided with a water level indicator and trap connection is attached to the bottom of the separator for collecting impurities.

Capacities in cfm. free air for the separator are 60-2,700 for single-stage compressors and from 75-44,000 for two-stage. Normal operating pressure is 125 lb. Units may be mounted in either horizontal or vertical position. —*R. P. Adams Co., Inc., 225 E. Park Drive, Buffalo 17, N. Y.*

Circle 123C on Reader Service Card



Portable Conveyor Speeds Handling

The task of loading and unloading trucks or freight cars to or from plants without loading docks is reported both accelerated and simplified with use of this portable conveyor.

Unit is designed for ready movement to the point where it is needed. Locked into position, it is set for handling heavy merchandise as well as lighter material. Supporting structure is sturdy, hence unit will withstand heavy loading shocks. Hydraulic adjustment mechanism enables conveyor to meet any truck or car level height.

Lower end of mover is designed so cartons or crates can be wheeled up on end by hand trucks readily guided onto belt.—*Speedways Conveyors Inc., 1263 Niagara St., Buffalo, N. Y.*

Circle 123D on Reader Service Card

five reasons why food men specify INLAND steel containers

1 TESTED—Every Inland container is individually tested to insure satisfactory performance in use.

2 SIZES AND STYLES—Inland containers . . . of every type used in your industry . . . are available in sizes from 3 to 58 gallons.

3 LINING RESEARCH—Inland . . . with the most experienced lining research department in the industry . . . has developed or improved container linings for hundreds of products.

4 CREATIVE DECORATION—Inland's creative staff can assist customers in developing effective container decoration—printed or lithographed—for greater sales impact.

5 SERVICE—Inland's service to users of Inland containers does not end with production and shipment. Its policy is one of complete customer satisfaction on container performance.

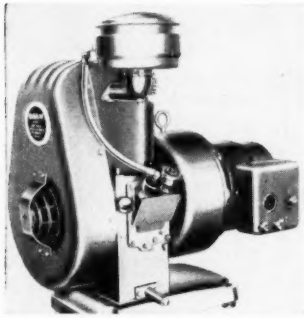
A SUBSIDIARY OF INLAND STEEL COMPANY

For more information write to

INLAND STEEL CONTAINER COMPANY

6532 SOUTH MENARD AVENUE · CHICAGO 38, ILLINOIS

Diesel Electric Plant Is Easy to Service



Simplified design is stated to make it possible for anyone to operate and service this new 3,000w. electric plant, powered by an air-cooled full-Diesel engine.

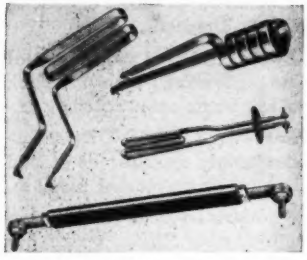
Push-switch control for electric cranking, manual compression release, and an electrically heated glow-plug for cold weather starting are provided on this unit, designated Model 3DSP-1E.

Improved, four-cycle, single-cylinder engine incorporates new features reported to increase power output and operating efficiency, with economy in use of low-cost furnace oil cited.

Compact and easily installed, unit generates 115v., 60-cycle, single-phase current. Model is described as conservatively rated to provide ample overload protection.—*D. W. Onan & Sons Inc., University Ave. S. E. at 25th., Minneapolis 14.*

Circle 125A on Reader Service Card

Electric Heat-Elements Have Flat Surfaces



Announced is a new, very flat, sheathed electric heating element, for industrial heating of kettles, tanks, driers, and for immersion in liquids.

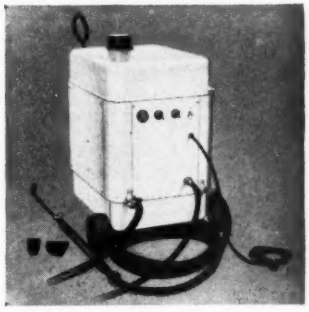
New type unit provides flat surfaces for contact heating and a thin section for convection and air-flow. Unit is rugged, readily bent and formed (see various shaped elements in illustration above), and is resistant to moisture and vibration.

The 5/32 in. thick, flat surfaces promote efficient radiation effects. They can be supplied with self-regulating characteristics where their wattage will vary inversely with heater temperature. Copper and steel are standard sheath materials although other alloys or platings can be supplied.

A variety of terminals are available or heaters may be brazed or welded into various fittings or provided with holdown straps or brackets. They are furnished in heated lengths up to 10 ft. and in widths of 33/32-in., and 17/32-in.—*Syntron Co., 460 Lexington Ave., Homer City, Pa.*

Circle 125B on Reader Service Card

Portable Cleaning Unit Uses Plant Steam



Any steam supply of 60 to 150 psi. may be used to operate this steam cleaner designed to remove grease and dirt from machinery, equipment, and floors.

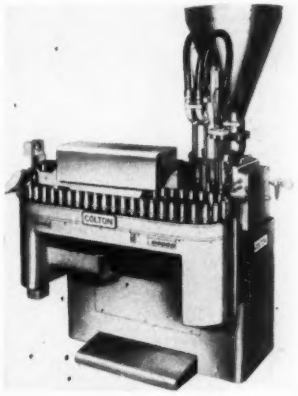
Known as Model F-15 "Fireless" Hy-Steam-Pressure Jenny, new unit was developed to clean many times faster than hand-cleaning methods. It mixes steam supply with positive-pumped proportions of water and cleaning solution for cleaning, sanitizing, and deodorizing.

Unit is portable for rolling right to the cleaning job. After connecting to steam and water supply lines, and 110v, 60 cycle a.c. lighting circuit, a flick of starting switch produces anywhere from 45 to 90 gph. of boiling hot chemical vapor spray. Where steam supply pressure exceeds 150 psi., maker advises use of a steam pressure regulator.

With inclusion of 25 ft. of vapor hose, cleaning gun with control system, and nozzles, unit weighs approximately 240 lb. Overall dimensions: Length 37 in., width 27 in., and height 37 in.—*Homestead Valve Mfg. Co., Coraopolis, Pa.*

Circle 125C on Reader Service Card

Filler-Closer Handles Large-Size Tubes



Added to line of tube-filling equipment is this No. 180 automatic filler and closer. Unit was created specifically for handling tubes up to 1¼-in. dia. in twin fillings and up to 1¾-in. dia. in single fillings.

In operation, tubes are placed in vertically mounted holders and moved to a filling head where they are filled from bottom up, to prevent air pockets. Metered quantity of paste, cream, liquid or powder is delivered by gravity feed from a 15-gal. hopper. Tubes then pass to closing and crimping stations.

No. 180 Standard Single has a capacity per minute of 55 tubes, ½-to-1¾-in. dia. by 7½-in. long. Standard Twin handles 85 tubes per minute up to 1¼-in. dia. by 7-in. long. Machines are powered by a 1½-hp. motors.

All parts are accessible for cleaning and adjustment.

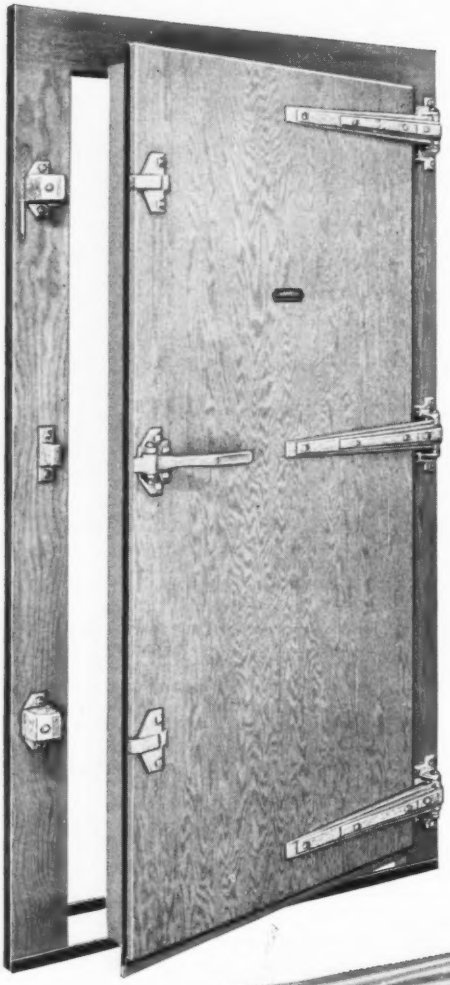
Optional equipment available includes an air-vacuum tube cleaner, a cap tightening unit, and a "no-tube-no-fill" attachment. To handle heavy materials that tend to settle, hopper may be equipped with a mechanical agitator, power operated. For materials that tend to solidify, hopper may be equipped with a heater that is adjustable to the temperature required to maintain uniform flow.—*Arthur Colton Co., Detroit.*

Circle 125D on Reader Service Card

Why "MARINE QUALITY" Plywood

with plastic bonding

makes Series "50" the finest cold storage door ever built



PLASTIC BOND GIVES EXTRA STRENGTH

Synthetic resin bond used between all plies. Uniform strength of bond and stress equalization assured by hot pressing and tempering after setting.

INSOLUBLE PLASTIC MAKES BOND WATERPROOF

SOAK IT

Passes test of alternate soaking 16 hours and drying 8 hours, repeated three times without affecting bond.

BOIL IT

Plastic bond passes four-hour boil test without any separation at plies.

PLASTIC BONDING IMPROVES SANITATION

Inorganic nature of bond will not support bacteria or fungi.

Monopanel Construction of Series "50" Doors Gives You These Other Advantages

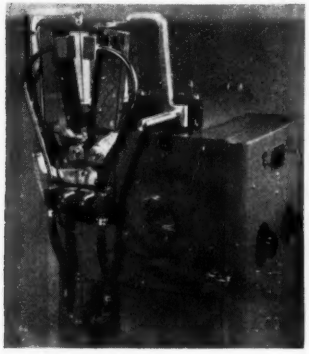
- **Smooth One-Piece Panels**—Look better, easier to keep clean.
- **7 Times Stronger**—By test compared with horizontal sheathing. Cross lamination of plies distributes strength equally in both directions.
- **6 Times More Rigid**—By test compared with horizontal sheathing. Large one-piece panels front and back give extra rigidity of box frame construction.
- **Rugged Adjustable Hardware**—E-Z-Open TWO Point Fastener and Adjustoflex hinges specially developed by Jamison to maintain uniform gasket pressure.
- **Dependable Gasketing**—Resilient Lo-Temp gasket for top and sides and tough flexible Sillseal gasket for door sill.

JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

For details and dimensions request Jamison Catalog No. 3. Jamison Cold Storage Door Company, Hagerstown, Md., U.S.A.

Fast Package Former Adjustable for Size



Flexibility, speed in operation, and low cost per finished package are reported features of a new model packaging machine known as Oto-Pak.

Especially designed for a sequence packaging operation, unit produces a flat bag from such packaging films as polyethylene, Pliofilm, and saran. Then, as the bag is completed, a device holds the bag open in a vertical position so that it can be filled either automatically or manually.

Accessory handling equipment has also been developed so that the machine conveys filled bags and top heat-seals them. Only one operator is required to run the unit.

Machine can be readily adjusted for bag size and for speed of operation. Films of various thickness can be used up to and including 6 mil polyethylene. Speed ranges up to 35-40 per min. Bags as small as 1-in. x 1-in. to as large as 14-in. x 20-in. can be made.—*P-N-R Corp.* 4500 *Euclid Ave., Cleveland* 3.

Circle 127A on Reader Service Card

Countershaft Drive Affords Wide Choice of Speeds

Speed variations for many applications are provided by a new versatile countershaft drive that comes as a complete unit.

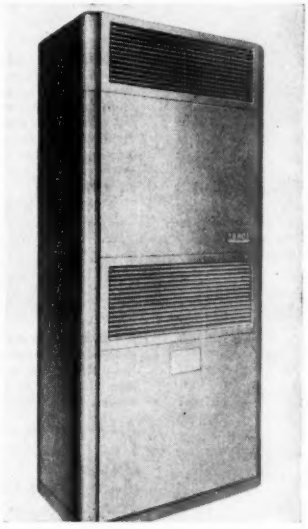
New drive is designed for installations where driven shaft speeds must be lower than motor shaft speeds. One unit utilizes 7-in. and 8-in. combination sheaves and is available for drives from 2 to 15 hp.

Assembly consists of a sealed ball-bearing countershaft stand, secured by rigid slide rods to an adjustable motor support for all motor sizes up to NEMA No. 326. Built-in control can be mounted in any one of a number of positions to suit requirements of installation.

Drive is uniquely designed so that complete assembly with combination sheaves may be used, or parts of assembly may be combined into other types of drives. For example: The various parts can be assembled as (1) a sliding motor base only; (2) a sliding countershaft base; (3) a fixed, center countershaft drive for ratios up to 8:1; or (4) a compound variable drive with speed changes up to 64:1. Maker states that remote control devices are easily adapted to assembly. —*Speed Selector Inc.,* 118 *Noble Court, Cleveland* 13.

Circle 127B on Reader Service Card

Quiet Air Conditioner Needs Little Service



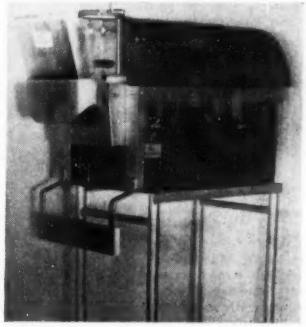
This new, self-contained air-conditioner is said to cut service and maintenance to a minimum, and to be silent in operation.

Designed to save floor space, unit incorporates a semi-hermetic compressor that is pre-serviced before sealing to reduce later maintenance and servicing. A glass fiber casing, acoustically and thermally insulated, and a vibration-muffling compressor mounting provide for quiet operation. Two-knob control panel in front of the unit cooler permits operator to set desired temperature, operate unit for either heating or cooling, or use the fan alone.

Conditioner, a complete package system, requires only one electrical and three piping connections. Units are made in 3, 5, and 7½-ton capacities —*The Trane Co., La Crosse, Wis.*

Circle 127C on Reader Service Card

Weighing Precision Marks Filler-Scale



Free-flowing materials can be bagged in any weight up to 200 lb., with this filler-scale. Accuracy of unit is plus or minus 1/10 lb. Up to ten 100-lb. bags per minute may be filled, depending upon density of material.

All parts of feeder which come in contact with material are made of stainless steel. Gate is self-cleaning in event material has tendency to cake, and it shuts off completely to protect hygroscopic materials and to stop flooding.

Complete absence of knife-edge pivots, crystals or bearings of any sort allow, states maker, a long guarantee of sensitivity and accuracy of scale. Construction is rugged.

In operation, attendant slips bag in place, pulls down and immediately releases handle on feeder to start filling process. Bags will either be automatically released after being filled or may be released by touching a switch near top of bag.

Three lights at eye-level indicate stages of filling process. Bottom light (amber) is on while a bag is being filled. Center light (white) indicates bag has been filled to proper weight. Top light (red) indicates bag is overweight. Scale will not automatically release an overweight bag.—*Thayer Scale & Engineering Corp., 494 E. Water St., Rockland, Mass.*

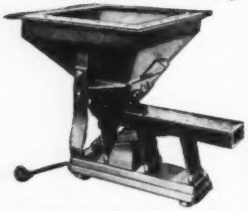
Circle 127D on Reader Service Card

LOOK AT ALL THESE . . .

Send for Catalog No. 830

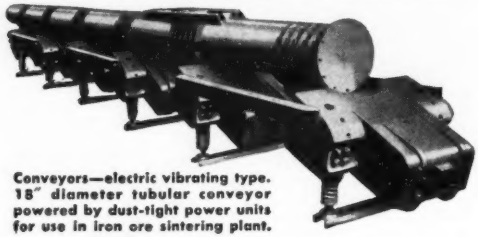
and all provide absolute control over tonnage handled in feeding and conveying operations

Built in a wide range of types and sizes, Jeffrey electric vibrating Feeders and Conveyors provide absolute control over tonnage handled. Open or enclosed pan, or tubular decks, for capacities ranging from a few pounds to fifteen hundred tons per hour. Investigate the accuracy of this equipment.

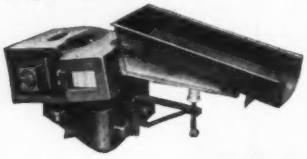


Small Reagent Feeders—with open or enclosed decks for capacities from 10 to 4000 lbs. per hour.

Spreading Feeders—for distributing materials evenly across wide surfaces.

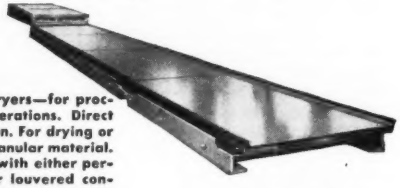


Conveyors—electric vibrating type. 18" diameter tubular conveyor powered by dust-tight power units for use in iron ore sintering plant.

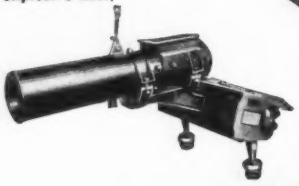


Spark-Proof Feeders (left)—for use in explosive atmospheres or where moisture conditions require special protection of coils.

Dust-Tight Feeders (right)—vibrating motor gaps protected from magnetic dust, or explosive dust.



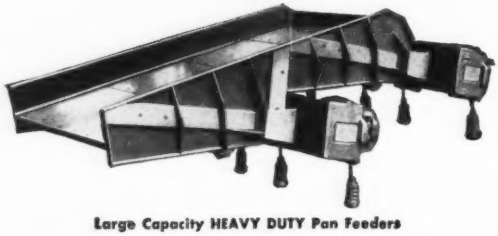
Coolers-Dryers—for processing operations. Direct type shown. For drying or cooling granular material. Equipped with either perforated or louvered conveying surface through which air or gasses are passed.



Water-Jacketed Feeders (left)—for feeding furnaces and driers, or handling hot material to coolers, etc.

Bin Level Indicator (above)—shows bin level at a glance to control feed to bin, maintain bin level or control discharging equipment.

Low Head type Barrel Packer (above)—a real economy in reducing size of containers, increasing capacity and cutting shipping costs. Can be supplied with deck to provide conveying action during packing operations.



Large Capacity HEAVY DUTY Pan Feeders

Also electric vibrating Screens, Bin Check Valves, Electronic Controls, Magnetic Separators and Mechanical Vibrating Conveyors. Let us tell you more about these units and what they can do for you. Write us today.

THE JEFFREY MANUFACTURING COMPANY

Established 1877

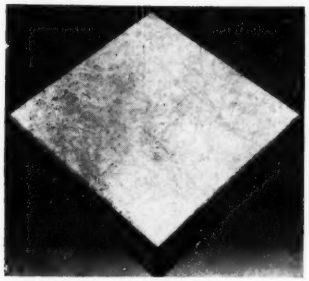
927 North Fourth St., Columbus 16, Ohio

Complete Line of Material Handling, Processing and Mining Equipment

Baltimore 2, Beckley, W. Va., Birmingham 3, Boston 16, Buffalo 2, Chicago 1, Cincinnati 2, Cleveland 15, Denver 2, Detroit 13, Forty Fort, Pa., Harlan, Ky., Houston 2, Jacksonville 2, Milwaukee 2, New York 7, Philadelphia 3, Pittsburgh 22, St. Louis 1, Salt Lake City 1

Jeffrey Mfg. Co. Ltd., Montreal, Canada
British Jeffrey-Diamond Ltd., Wakefield, England
Jeffrey-Galion (Pty.) Ltd., Johannesburg, S. A.
The Galion Iron Works & Mfg. Co., Galion and Bucyrus, Ohio
Galion (Great Britain Ltd.), Wakefield, England
The Ohio Malleable Iron Co., Columbus, Ohio
The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio

Offer Acoustical Tile For Heavy Service



Designed for areas requiring frequent and severe maintenance, a new membrane-faced Fiberglas acoustical tile offers several special features. The non-combustible product consists of a decorative plastic film stretched over the face of the tile and cemented on the edges.

New tile has no perforations or surface openings in which grease, dirt, or other foreign matter can lodge. Cited are ease in washing or scrubbing, low moisture absorption properties, and good sound absorption qualities.

Product incorporates a principle of sound absorption by which the plastic film, stretched across the acoustical tile facing, acts as a drum-head. This is described as transmitting sound by vibration into the board, which reduces noise by trapping the sound waves in tiny cells formed by the intertwining of fine fibers of glass.

Tile is available in a gray mother-of-pearl design. Alternate colors and textures will be available soon.—*Owens-Corning Fiberglas Corp., Toledo 1, Ohio.*

Circle 129A on Reader Service Card

New Chemicals

Meat Plant Sanitation Aided by Fumigant

Use of methyl bromide promises to simplify sanitation in meat plants. This material has been recently added to the list of products tested and accepted for such use by the USDA.

Supplier states that acceptance of methyl bromide for use in this type of fumigation climaxed seven years of laboratory work and field testing in cooperation with the Meat Inspection Div., Bureau of Animal Husbandry.

It is reported that the tests showed methyl bromide can maintain excellent insect and rodent control in plants and curing houses without contamination of meat or imparting of odor, taste or toxic residue. Rodents, cockroaches, ham, beetles, ham mites, and other vermin, are said to be readily controlled by it.—*The Dow Chemical Co., Midland, Mich.*

Circle 129B on Reader Service Card

Enzyme Product Promotes Quality in Coffee Curing

A new enzyme product is now being offered as a special coffee-curing aid designed to assure rigid control of quality through preventive action against spoilage in the risky fermentation step.

Behind the new product, states maker, are some twelve years of laboratory research and large scale field tests.

The new method of curing centers around a natural enzyme powder sold under the tradename "Benefax." This powder is reported to so speed the fermentation step that chance of spoilage in this phase is markedly reduced, and higher quality coffee is thus promoted.

Enzymes which develop during fermentation "digest" a coating of "mucilage" (actually a slippery, rather than sticky, substance) which covers the coffee bean. Addition of the powder starts the enzymatic action immediately and thus speeds the natural reactions.

The powder containing the natural enzymes is mixed with the coffee to be cured after the pulp surrounding the bean has been mechanically exposed. Only minute quantities of the powder are required.

Specially cited advantages with use of the product: (1) New speed in getting crop to market, (2) permits definite scheduling of curing process, (3) reduced labor costs, and (4) economies through reduction in the need for fermentation tanks.—*Standard Brands Inc., 595 Madison Ave., New York City.*

Circle 129C on Reader Service Card

Flavoring Material Has Strength-Plus

Excellent results both in flavor and economy are reported with use of a new flavoring material in confections, dairy goods, and baked products.

Called Vanitrope, it is a newly developed, definite chemical body. Its chemical structure is 1 ethoxy, 2 hydroxy, 4 propenyl benzene, ($C_{11}H_{14}O_2$), with a molecular weight of 178. Material, a finely-powdered, free-flowing, white crystal, is described as having a strong, sweet aroma of great intensity, pleasant tonality, and a pleasant taste of unique sweetness.

Material, says maker, is stable, will not discolor, is non-hygroscopic, and remains free flowing under proper storage conditions.

Vanitrope is reported to boost flavor power, and thus reduce the quantity of flavoring material needed for a given purpose. Material is termed deceptively powerful, and users are advised not to underestimate its strength. Overuse can give rise to a phenolic or chemical note.—*Fine Chemicals Div., Shulton, Inc., 630 Fifth Ave., N. Y. C. 20.*

Circle 129D on Reader Service Card

New Powdered Detergent Speeds Cleaning Work

Developed for faster equipment-cleaning, a new powdered detergent is stated to readily remove oil- and mineral-based soils commonly encountered on equipment in meat, bottling, dairy and bakery plants.

Known as "No. 67," it is soluble in warm and hot water. It contains ingredients to soften hard water, to speed up wetting of soils, and to emulsify oil-based soils and de-mineralize those high in mineral content.

Its solutions are said to rinse quickly in hot and cold water, permitting equipment surfaces to dry without streaking. In use, solutions are reported to form light suds, to clean at low concentrations, and to be easy on operator's hands.—*Oakite Products, Inc., 126G Thames St., New York City.*

Circle 129E on Reader Service Card

Stops Scatter of Glass From Broken Bulbs

Danger of glass particles from broken bulbs scattering and contaminating food is claimed to be eliminated by application of a special coating over the lights.

Called Tecogel, it is a clear lacquer-type, anti-fragmentation coating. Maker reports the material has been used successfully for over a year in meat packing plants. Applied by hot-dipping, it sets in 2 to 3 min., and dries hard in 2 to 3 hr. For best results, manufacturer recommends that coated bulbs be allowed to dry 4 or 5 days before being put in service.—*Thompson & Co., Oakmont, Pa.*

Circle 129F on Reader Service Card

In Behalf of Progress . . .

Better Heed the "Wolf" Cry This Time

So you haven't had too much trouble in procuring new equipment—not even stainless steel units? Yet they made dire prophesies last year that the metals shortage would make equipment hard to come by—if not impossible!

This doesn't mean that you can be complacent now. True, they yelled "wolf" and the beast didn't bite you. But they weren't entirely wrong. Just a little premature.

This year will be tougher than last in respect to metal shortages—and probably the worst the country will experience, barring a major war. There are two principal reasons. First, the food industry plans to spend more for modernization this year than last—$584.4 million. And an additional $184.6 million is scheduled for expansion (see page 66). Second, defense production will chew up scarce metals faster because it is shifting from the construction to the production stage.

And the metals supply situation leaves much to be desired. Nickel for stainless steel is extremely tight, being in big demand for jet engines. Likely you will have to use chrome steel, it having recently been decontrolled. Plate and structural steel are scarce, but carbon sheet steel is in good supply. Tin was not bought for many months, but is coming in again since the price jam was broken by the deal with Britain. It is available if we pay the price. Copper is critically short. Aluminum is tight and is needed in great quantity for the airplane program, although some has been obtained from England and production is being upped, as is that of steel.

As a result of the tight supply-demand picture, current allocations of materials to equipment manufacturers are sharply lower than those of the fourth quarter of 1951. And it appears that the equipment firms will be forced to get along with a materials supply substantially below that of 1949.

In view of this worrisome situation, it is unbelievable that the director of one of the main branches of PMA—which deals with NPA to get food equipment allocations—would be forced to make this observation: "We are getting practically no questions about the Controlled Materials Plan, or about allocations of materials for processing equipment."

This same official points out that he had heard little from canners by mid-January about their building projects for the second quarter.

You better speak up for what you need. Otherwise you may find a wolf at your door and some of your future customers at the doors of more alert competitors.

Handicapped Can Help You

We know of a blind woman in a midwestern town who lived miserably, without pride or hope, on relief checks. Now she is supporting herself and holding her head high. Why?

Because a meat packer had the vision to see that she could tie the strings to the tags used on carcasses in his plant. She even can do it at home.

A little thought will reveal many jobs for the handicapped in food plants. Could not the blind, for example, set up folding cartons? Couldn't they even hand-dip chocolates?

And who would be more intent on visual inspection of bottled beverages or vegetables on a canning line than a deaf person not distracted by noise?

And why can't one-armed people operate push-button machinery?

There are at least four good reasons for employing handicapped workers: (1) Many food plants will face a serious labor shortage this summer—many in defense-plant areas are having trouble now. (2) Handicapped workers make efficient and loyal workers on jobs to which they are suited. (3) Food plants can perform a social service by hiring such unfortunates. (4) And they can build goodwill in their local areas.

It pays to mix human engineering with food engineering.

Food Law Points and Proposal

As emphasized here last month, it is important that food processors make up their minds about proposed changes in the federal food law. To give you pros and cons to stimulate your thinking, we present, on page 142, excerpts from papers on chemicals in foods given at the recent MCA interindustry conference.

We believe that an amendment would benefit the industry by helping to maintain public confidence in processed foods. And we think that the amendment should call for prior notification of use of "new chemical" additives, accompanied by evidence of their safety. Then a processor could go ahead after 90 days, unless F&DA intervened because of inadequate evidence as to the safety of the food individually and as a factor in the total diet. In important and difficult cases, the final decision would be in the courts.

PROCESS CONTROL & PLANT SAFETY IMPROVED WITH

STERLING SPEED-TROL!

We have found Speed-Trol to be the most satisfactory variable speed drive for quickly and accurately adjusting the speed of our prune processor as required by varying product characteristics, writes Mr. F. Bentley of Rosenberg Bros. & Co., Santa Clara, Calif. Compact and completely self-contained, Speed-Trol eliminates outside belts, gears, bearings, pulleys and shafts, and so eliminates sources of mechanical failures and injury to personnel.

STERLING SPEED-TROL GIVES YOU VARIABLE SPEED CONTROL NECESSARY FOR:

EQUIPMENT ADAPTATION TO: Sequence synchronization—operators' abilities—load variations due to differences in quantity, quality, weight, size, tension, hardness or shape of material to be processed, machined, conveyed, blended, mixed, etc.

PROCESS CONTROL OF: Temperature—viscosity—level—pressure—flow—etc.

TIME CONTROL OF: Baking—drying—heating—cooking—pasteurizing—soaking—chemical action—etc.

With Speed-Trol you get the maximum in production, plant efficiency, quality and profit

OTHER STERLING ELECTRIC POWER DRIVES:

- **STERLING SLO-SPEED (GEARED) MOTORS**
- **STERLING KLOSD AND KLOSD-TITE (NORMAL SPEED) MOTORS**

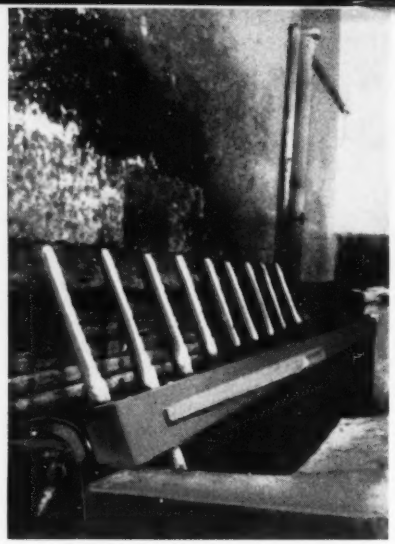
DRIP-PROOF • SPLASH-PROOF • TOTALLY ENCLOSED

70 ILLUSTRATIONS showing how Sterling Electric Power Drives reduce production costs. Write for Bulletin No. A 122

STERLING ELECTRIC MOTORS

Plants: New York City 51; Van Wert, Ohio; Los Angeles 22; Hamilton, Canada; Santiago, Chile.
Offices and distributors in all principal cities.

1 ROOTS arrive by truck and are manually unloaded on washer feed platform.



2 WOODEN PADDLES move roots through trough-type washers to remove adhering dirt.

UNFOLD HERE

Making Top-Grade Tapioca Flour

Newly Engineered Line Raises Output, Quality of Brazilian Product

WHEN World War II and its unsettled aftermath in the Far East cut off Java's export of high grade tapioca flour to the U.S., interests operating factories in South Brazil were stimulated to install modern equipment and step up their quality control methods. Today, they are shipping large quantities of high quality tapioca flour to this country.

The improved South American manufacture is illustrated in the accompanying flow diagram. Manioc roots arrive at processing plants in large trucks, which are weighed on a platform scale and unloaded manually—Point (1). Roots are then shoveled into trough-shaped wooden washers with paddles for moving them forward under sprays of water that remove adhering dirt. Then they go to peeling units, where paddles similar to those in the washers remove the thin outer skins. In the inspection that follows, poorly peeled roots are removed and returned to the peelers.

To liberate the starch from the cell structure, saw-blade rasps with rotors about 50 cm. in dia. (similar to the Jahn rasps employed in the potato starch industry) are in general use. Retaining screens with circular holes of 3½-mm. dia. prevent passage of oversize material.

To effect separation of starch from the pulp mass, three trough-shaped brush-washers of perforated copper sheets about 20 ft. long and equipped with water sprays are used—Point (4). To conserve water, starch milk from the third washer is employed as a source of liquid for the second worker.

Upon leaving the first washer the pulp goes to a hammer mill equipped with a retaining screen having 1-mm. dia. perforations.

Milk from the brush washers is given two successive screenings through vibrating screens of 120 and 200 mesh, respectively. The reciprocating units operate at 200-300 cycles per min. Made of phosphor-bronze, the screens give good service.

A greatly improved flour is obtained when a 0.2 percent SO_2 solution is added, at a rate of 0.265 gal. per 4.4 lb. of dry starch, before the final wet screening.

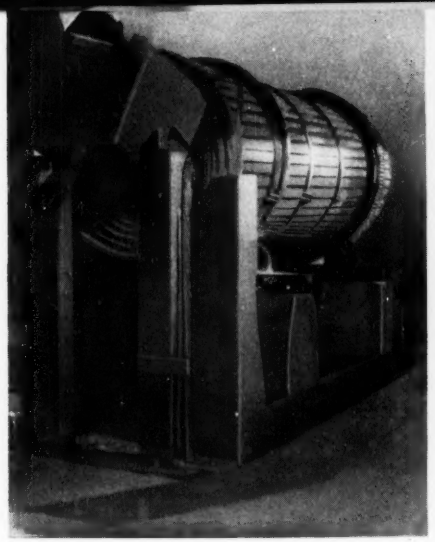
Ground sulfur is burned in a water-jacketed cast iron burner, then the SO_2 enters an absorption column, where it is dissolved in water. The solution is stored in wooden tanks and pumped to processing as needed.

For quick separation of fruit water from starch and cellulose, a Brazilian-built copy of the German "Uhland" centrifuge is employed. The starch is re-slurried with fresh water and discharged to tables. These are of glazed tile or concrete, about 130 ft. long and with individual channels about 1½ ft. wide. Several sets are arranged on successive floors of the table house. Feed concentration is 3-4 deg. Bé.

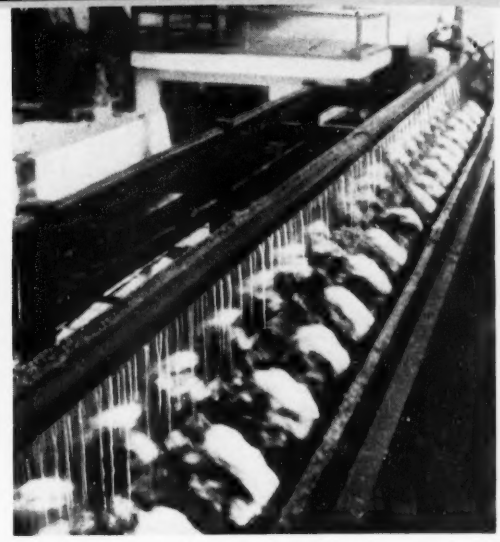
Liquid from the final table flows to a large settling basin, where low grade starch is settled out. This is moved to an open air platform—Point (10)—where it is first dried, then manually bagged in cotton bags. (*Cont'd next page* →)

Story Behind the Line

The high-performance system pictured here didn't "just grow like Topsy." Putting it into action required a special program precisely geared to surmount an array of tough problems—as told in this month's feature, "GF-Brazil Plan Wins Tapioca Capacity and Quality." You'll find it on page 56.

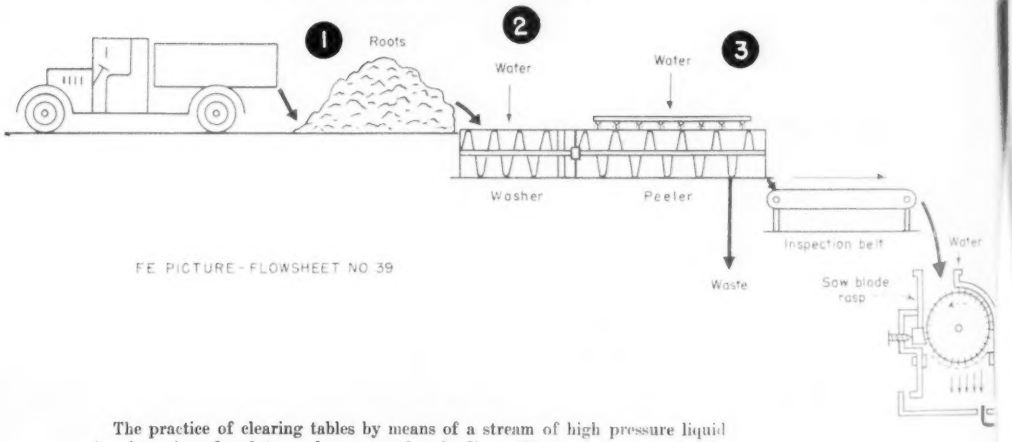


3 **PEELERS** loosen thin outer skins, then water sprays complete their removal.



4 **BRUSHES** work pulp against semi-cylindrical copper sieve and assist water to leach out starch as "milk."

IMPROVED BRAZILIAN TAPIOCA OPERATION



FE PICTURE-FLOWSHEET NO 39

The practice of clearing tables by means of a stream of high pressure liquid has been introduced to replace manual unloading. The equipment is simple, consisting of a centrifugal pump, a long rubber hose with nozzle, a tank with agitator, and necessary connections for recirculating the slurry. This installation saves labor and makes possible clearing of the tables every 12 hr. instead of once or twice a week as formerly.

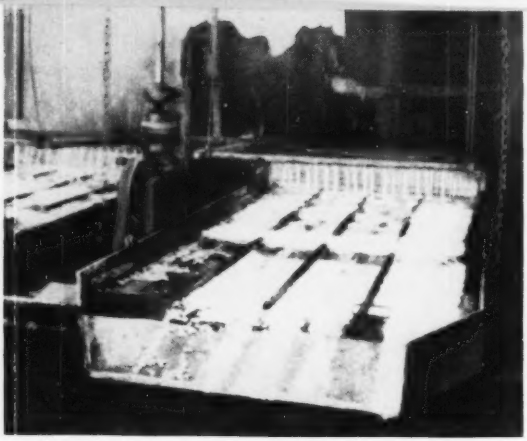
Starch from the tables is washed several times in large tanks, then dewatered for 30 min. in batch-type, perforated basket centrifuges—Point (7). A thin layer of dirt is often found on the inside surface of the centrifuge cake. It is removed by scraping.

Among the dryers employed in Brazil are: Steam-heated vacuum; tunnel; loft with natural circulation, and flash dryers. The use of vacuum dryers is common in most of the larger plants.

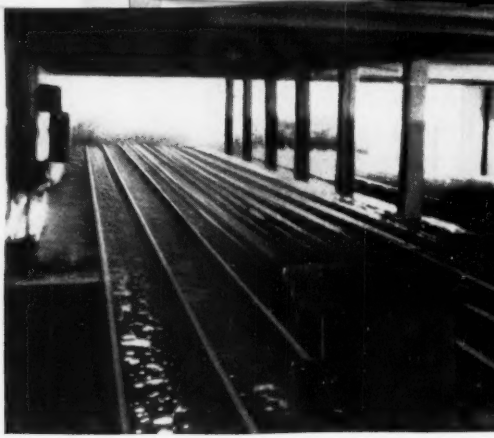
Occasional large lumps of "cooked" starch are formed in vacuum dryers. These are removed by means of a 6-mesh shaking screen. The product is then bolted through 14XX silk. "Overs" are ground and sold as low grade flour.

Flour that passes through the silk screen goes to semi-automatic filling machines, where it is filled into 6-ply paper bags holding 110 lb. Bags are check-weighed before closing.

9 **LARGE BASIN**
ble and settles

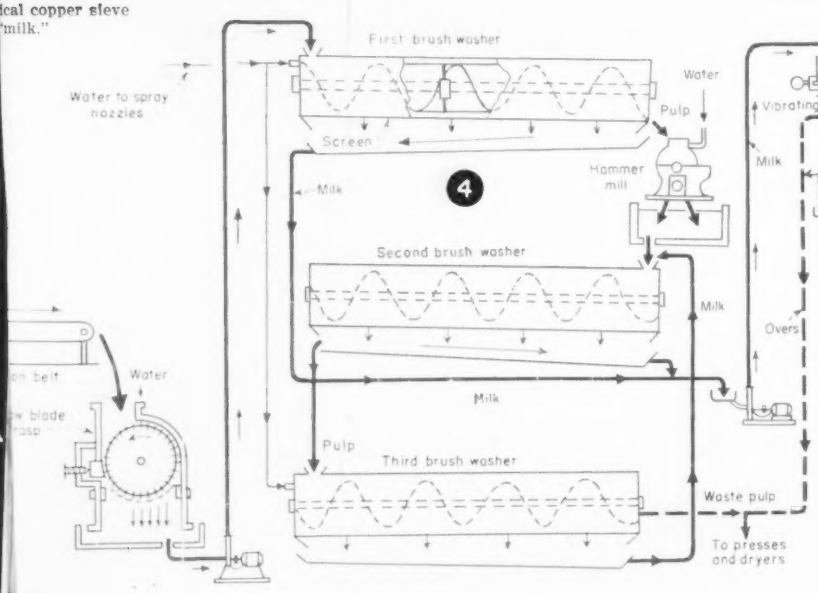


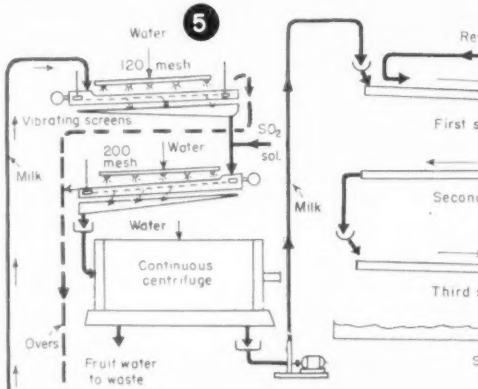
5 **SCREENS,** vibrating 200-300 cycles per min., complete removal of fine pulp and foreign matter from the starch milk.



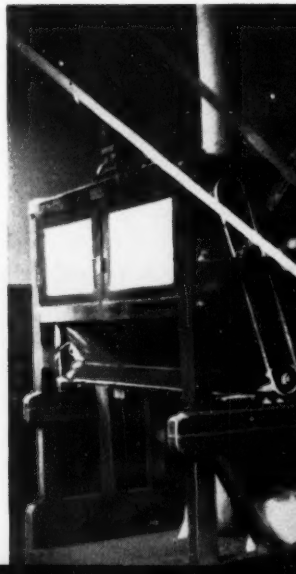
6 **TABLES** of glazed tile or specially coated concrete, appro ft. long are used to settle out the starch from slowly flo

ical copper sieve
"milk."

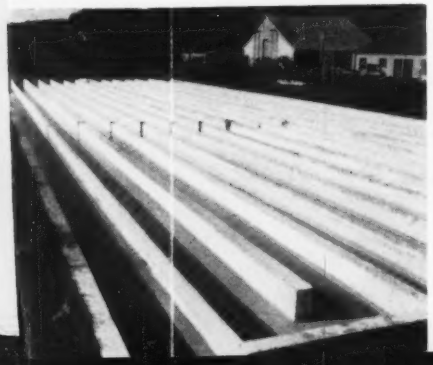




11 **SILKING REEL** separates hig starch from lumps of "cooked"



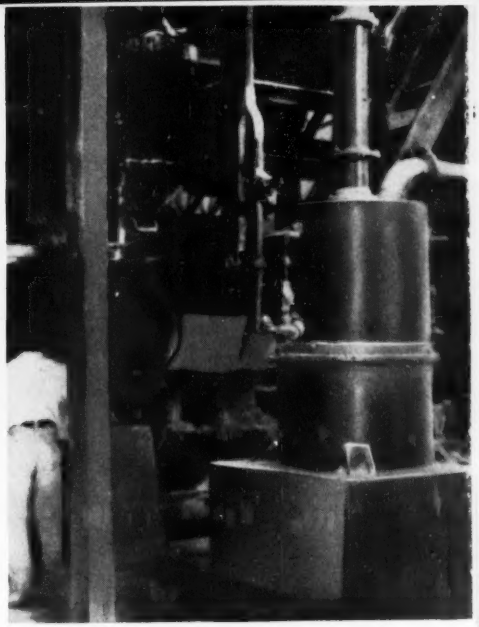
9 **LARGE BASIN** receives discharge from final table and settles out low grade starch.



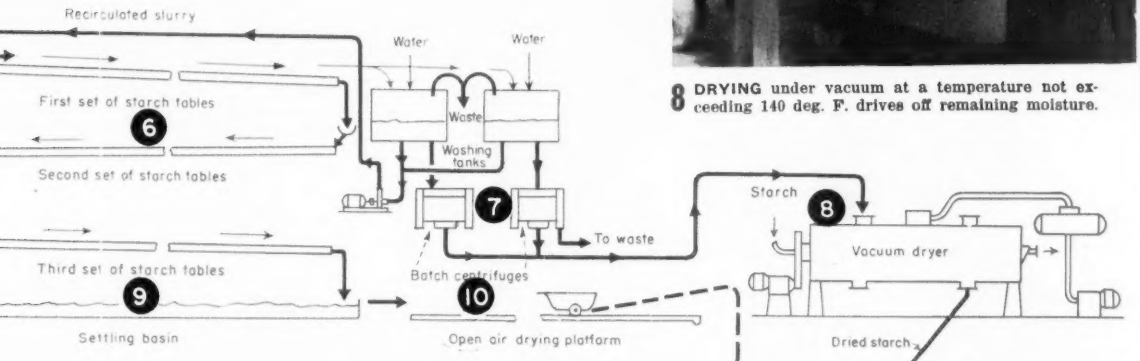
10 **LOW GRADE STARCH** is transferred from settling basin to large platform and air dried.

rete, approximately 130 slowly flowing slurry.

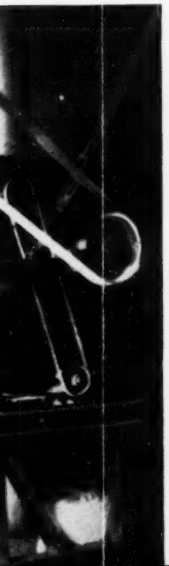
7 BATCH-TYPE CENTRIFUGES dewater the starch after it is washed following tabling operation.



8 DRYING under vacuum at a temperature not exceeding 140 deg. F. drives off remaining moisture.



arates high grade "cooked" product.



12 SEMI-AUTOMATIC filling in 50-lb., 6-ply paper bags is final step in preparing high grade flour.

STRETCH OUT YOUR STAINLESS, TOO

There *are* ways to stretch out your supply of stainless.

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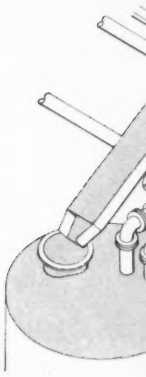

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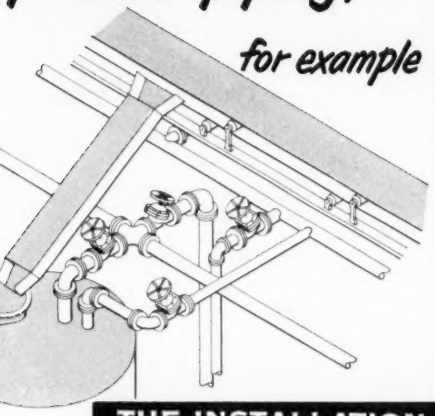
VALVES •

...ow to Reduce High Valve Costs

...n corrosive process piping, for example



THE INSTALLATION

...epwater solution lines to steam-heated steep-...nks at American Maize Products Co. plant, ...mond, Ind.

THE HISTORY

...lant had a problem of continual nuisance and ... frequent valve re-packing. The valves then ...used in steepwater lines were subject to con-...eakage and rapid wear under exposure to ...ik acid vapors present in the steeping process. ...problem was solved by replacing with Crane ...ody Packless Diaphragm Valves. Even after ...s' continuous service, these Crane valves ...ed not a penny's maintenance cost—showed ...kage, no sign of corrosion, erosion, or undue ...Already, Crane Diaphragm valves have given ...han double the repair-free service obtained ...ny other valve used.

VALVE SERVICE RATINGS

SUITABILITY:	Packless feature good
MAINTENANCE COST:	None in 4 years
CORROSION-RESISTANCE:	No sign of Corrosion
SERVICE LIFE:	No sign of wear - looks indefinite
OPERATING RESULTS:	Excessive costs eliminated
PRICE:	Moderate - much less than alloy Valves
AVAILABILITY:	Stock item in Crane line

THE VALVE

Crane No. 1611 Iron Body Packless Diaphragm Valves, featuring separate disc and diaphragm design. Diaphragm used to seal bonnet and stem only; is not subject to crushing and rapid wear. Separate disc insures positive seating even should diaphragm fail. Available with Neoprene diaphragm and disc insert, or fully Neoprene lined. See your Crane Catalog or Crane Representative.

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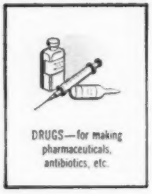
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POINTING the WAY To Continuing Prosperity

The set of figures in the middle of this page is news of high importance to every American.

In effect, it says that there is no basis in fact for all this talk about a collapse of capital expenditures plunging us into a depression following the industrial build-up for defense.

Such talk assumes that without defense orders business would spend relatively little for new industrial plant and equipment. The figures below show that that assumption is not justified.

penditures in 1953, 1954 and 1955, provided the money to carry them out can be obtained.

A Record in '52

As was expected, their plans call for another record-breaking volume of capital expenditures by business in 1952. But, as many did not expect, the McGraw-Hill survey also discloses plans for very heavy capital expenditures in each of the three years following. Expenditures now planned for those years are, to be sure, lower than those planned for 1952. But the significant fact is not that

BUSINESS PLANS FOR NEW PLANTS AND EQUIPMENT (Millions of Dollars)

	Actual Spending 1950*	Actual Spending 1951*	McGraw-Hill Survey			
			Planned	— Preliminary Plans —		
			1952	1953	1954	1955
Manufacturing	7,491	11,141	12,921	10,028	8,525	8,194
Mining	684	806	943	415	321	358
Railroads	1,136	1,564	1,642	1,248	1,117	1,002
Electric & Gas Utilities**	3,298	3,676	3,948	3,360	3,204	2,748
Other Transportation & Communications	1,392	1,592	1,721	1,671	1,943	1,839
ALL INDUSTRY	14,001	18,779	21,175	16,722	15,110	14,141

*U. S. Department of Commerce
**Electrical World (A McGraw-Hill publication) and American Gas Association.

The figures come from the fifth annual McGraw-Hill survey of business plans for new plant and equipment. Companies were asked to report through that survey not only their plans for 1952, but plans they now have in hand for capital ex-

they are lower. Experience shows that plans made several years ahead always overlook many expenditures that are needed later.

The significant fact is that the expenditures already planned for 1953-55 are so high. For example,

those now planned for 1955 would be higher than those of 1950, which, at that time, were second highest in our history.

If these plans are carried out we shall have an essential element of continuing prosperity. Sustained expenditures for capital expansion and betterment account directly for a large share of our employment and consumer income. Moreover, consistent modernization of industrial plant raises production efficiency and brings more and better goods and services within reach of more consumers.

It is not to be expected, of course, that we can come down from the peak of the defense boom without readjustments in some sectors of business. But if capital expenditures by business are carried out on the scale now planned, we shall be able to take any necessary readjustments in our stride, and continue to increase our industrial strength.

From V-J Day to the end of this year, manufacturing industries will have spent over $60 billion for new industrial plant and equipment. This is more than the value of all the plant and equipment these industries had on their books at the end of World War II. It is this heavy outlay that causes some, assuming most postwar plans for industrial expansion and modernization will be completed, to fear a collapse of capital expenditure.

Plans to Go Ahead

But American industry still has plans to go right ahead expanding and improving its facilities. This was the most striking single finding of this year's survey.* It disclosed also that after 1952:

—83 per cent of the companies answering the survey are planning substantial further modernization.

—48 per cent will need more capacity to make their present products.

—33 per cent plan additional capacity to make new products.

It cannot be too strongly emphasized, however, that these plans represent what American industry *wants* to do. They are a concrete expression of hope and aspiration. As such they are extremely important, for they dispose of the idea that business considers the job of expanding and improving its facilities as finished, or anywhere near finished.

But the plans carry no guarantee of accomplishment. If they are to be realized, business must have the funds to carry them out. There is no assurance that the money will be available if the present level of corporation taxes is continued. Eight out of ten companies, according to the McGraw-Hill survey, will rely entirely on profits and reserves to finance their 1953-55 programs. So, in calculating their programs for these years, the companies were asked to assume relief from "excess profits" taxation.

Federal taxes now take at least 52 per cent of a corporation's profits, and 82 per cent of any profits in the so-called "excess profits" bracket. Despite this drain on their funds, companies are able to finance their 1952 programs because (1) they are borrowing heavily, and (2) many of them are getting government loans or special tax concessions on new facilities installed for defense purposes. But these are emergency aids.

Only Two Ways

When the present defense program tapers off, there will be only two ways by which business can possibly increase its principal source of funds for new plant and equipment. One way is to make more profits before the tax collector takes his cut. And the only way many companies, already operating at capacity and high efficiency, can do that quickly is by raising their prices. That is an unpopular method. Also, with the return to more competitive markets, it might be self-defeating.

The other way is for the federal government to release its strangle hold on business profits. The so-called "excess profits" tax—the 82 per cent tax which is really a tax on business growth—should be repealed, effective January 1, 1953. And a cut in the basic tax of 52 per cent on all corporate profits should come not much later. That is by all odds the most important single step toward assuring that business plans already made for capital investment in 1953, 1954 and 1955 are carried out. It is the most important single step toward sustaining our present prosperity.

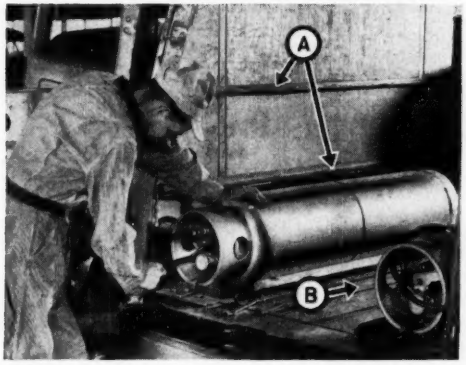
Through its plans for continued expansion and improvement of its facilities, American business clearly points the way to avoid the depression that so many have feared – and the Communists have so ardently hoped – would follow the peak of defense mobilization. It will be a tragedy for our country and for Americans in every walk of life if we do not insist that business get the chance to follow this wise and constructive course.

McGraw-Hill Publishing Company, Inc.

***Note – A copy of the full report of this survey can be obtained by addressing: Department of Economics, McGraw-Hill Publishing Co., Inc., 330 West 42nd St., New York 36, N. Y.**

OMAR'S COST SAVER: It's run by . . .

tanks of LPG feeding . . .



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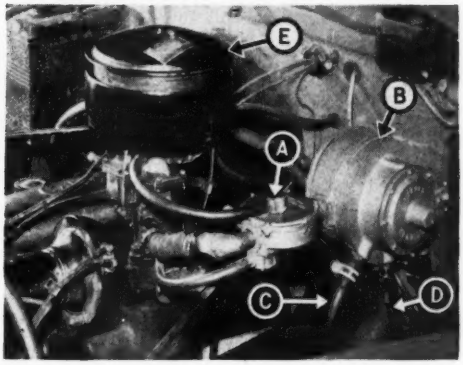


HERE's "how" of change to LPG. Left: Two cylinders fit in at either side within body and are rigidly braced. Garageman is seen tightening connection on new tank after removing spent one. Bread is carried on two shelves that rest on angle irons (A) and also in two drawers that slide in at (B). Right: Engine conversion components include low pressure regulator (A) and vaporizing unit (B). Heat is supplied by hot water coming from cooling system (C). At (D) is seen LPG feed line from cylinder in rear of truck. Standard air cleaner (E) is retained.

"Bottle-Gassed" Trucks Give Them

More Delivery Miles Per Dollar

Maintenance expenses come down, engine life goes up, when Nebraska bakery converts 130 bread vehicles to run on LPG fuel. Standard engines are used

THE BOLD DECISION that it would shun the gas pumps and run its large fleet of half-ton bakery delivery trucks on LPG fuel—was made last spring by the enterprising Omar, Inc., of Omaha, Neb.

And today this radical move is judged to be paying off in—

1. **Lower operating costs per truck and more engine power.**
2. **Lower running-maintenance costs because the oil is cleaner.**
3. **Prolonged engine-life, and hence fewer overhauls, because this filtered fuel is more pure.**

The change was initiated in May, 1951, with 39 route trucks out of the company's Omaha South sales branch, then 30 more working from the Lincoln, Neb., branch, and finally 61 from the Omaha North plant—a total of 130 trucks.

Omar executives decided to try plentiful LPG as (A) an insurance

Q.—Just What Is LPG?

A.—The letters stand for "Liquefied Petroleum Gases" which, initially, were merely "unhandy" byproducts from the manufacture of gasoline. Too volatile to stay in gasoline, they condense to a liquid with only slight pressure. More commonly known as "bottled gas," LPG is mainly a mixture of propane and butane.

It was first put to volume-commercial use for rural-home cooking and heating, is now employed on almost all house trailers as well—and of late is being adopted to power various movers and vehicles, as brought out in this article.

As for supply, LPG is plentiful, since more and more of the materials are coming off as our gasoline production expands.

LPG has a higher octane rating than regular auto-grade gasoline, but it doesn't pack as much energy per gallon. The table below offers salient comparisons of the fuels in question:

Fuel	Lb. Per Gallon	Btu. Per Gallon	Btu. as % to Gasoline	Octane Rating	Boiling Point (Deg. F.)
100% Propane	4.24	91,300	71	125	—44
100% Butane	4.85	103,000	80	92	—32
Gasoline	6.20	129,000	100	70	+90

measure against possible future gasoline shortages, and (B) to see if they could practically realize the reputed economies (overall savings with LPG-fueled trucks have been broadly estimated by a gas industry representative as running from 10 to 15 percent, with the greatest economies credited to the less expensive maintenance).

LPG, or "bottled gas," is relatively new in the automotive field. In fact, due to the special facilities required, only fleet operators can feasibly consider its use at present.

Conversion by the bakery wasn't easy, even though the standard gasoline engines were retained. Special fuel cylinders and bracing for them had to be designed and installed in the delivery trucks. Also, a convenient supply of LPG had to be made available for filling the special cylinders.

As for engines specially designed to use LPG, the fact is that only a very few are yet available.* The bulk of LPG currently employed as motor fuel is being consumed in conventional gasoline engines—which cannot take full advantage of LPG's combustion qualities.

Before converting its complete fleet, Omar tested six experimental route trucks. These were run on LPG for several months to afford careful checks on operating conditions, various methods of mounting LPG cylinders in the vehicles, and different types of engine-conversion units.

How Cylinders Are Carried

Two LPG cylinders are used in each delivery truck. Both are laid lengthwise on the body floor—one on each side just within the rear door.

Bread is then carried in two drawers and on two shelves. The 24-in. drawers are placed one in front of the other on the truck floor and slide on angle iron guides between the gas cylinders. The shelves extend the entire width of the truck body—one directly above the other. The lower one rests about ½ in. above the cylinders so that either of the latter can be removed without disturbing the shelf.

Longitudinal hardwood skids provide a rigid bracing for the bottled gas tanks. And metal clamps, bolted to the body floor, prevent any backward or forward movement. These clamps are readily removed to permit replacement of empty cylinders. Also, the piping connections are securely held.

This bracing has proved satisfactory, even on the roughest roads encountered.

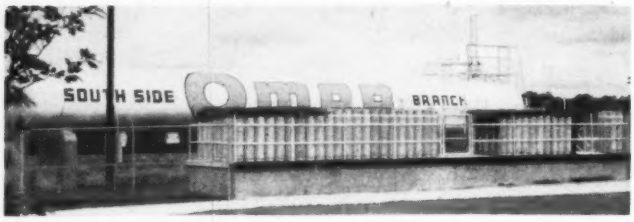
When the rear doors of the truck are opened, the driver or mechanic has easy access (see photo) to the cylinder valves and connections. The valves have been placed to face the rear to permit quick changeover from one cylinder to the other.

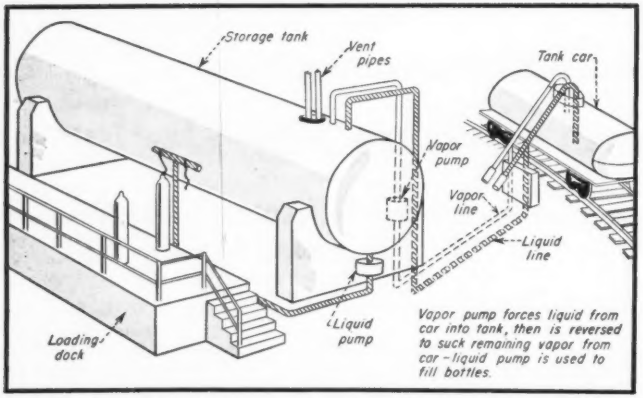
Empty bottles are slid out and new ones slid in along the hardwood skids. Once in place, new bottles are connected to a common fuel line to the engine via a T-block connection just below the floor. The T-block contains a slug check valve which allows only one cylinder to feed the line at a time.

When his first tank is empty, the driver need only go to the rear and switch the valves to put the second one on the line. Why this operation

(*Turn to page* 180)

Takes Place of the Gas Pumps




Storage tank
Vent pipes
Tank car
Vapor pump
Vapor line
Liquid line
Liquid pump
Loading dock
Vapor pump forces liquid from car into tank, then is reversed to suck remaining vapor from car—liquid pump is used to fill bottles.

SUPPLY SETUP is major facility. Top: Omar's 30,000-gal. bulk storage unit and (foreground) cylinder loading platform. Above: Schematic shows how the reservoir is filled with LPG from tank car arriving at adjacent siding.

* One such power plant—the Twin Coach Co.'s 10-to-1 compression propane model—was described in the article, "This Truck's Engine is Tucked Under," p. 82, Jan. '51 *Food Industries*.

Commercial Promise Seen for

11 New Guava Products

Varied processes developed by researchers at University of Miami . . . Frozen concentrated juice is getting first market trial . . . Uses of other tropical fruits are also being explored

C. E. WRIGHT
"Food Engineering" Correspondent

Fully eleven new—and distinctly promising—commercial processing possibilities for the vitamin-C-rich guava fruit have now been opened up through the comprehensive tropical-fruit product development work of the Food Technology Research Laboratories of the University of Miami.

Heretofore, the processing potential of this fruit has been almost entirely identified with the manufacture of the well-known guava jelly. But now the exploratory projects carried out at Miami indicate that the guava is highly suitable for making—

1. A frozen guava concentrate juice; 2. a puree-form baby food frozen in glass containers; 3. the same puree heat-processed and canned; 4. a frozen fresh-guava product, both in sliced and puree form; 5. dehydrated guavas packaged as a dried fruit; 6. dehydrated guavas ground into a vitamin-form powder; 7. sun-dried guavas; 8. canned guavas; 9. guava pastes; 10. guava candies; and 11. guava punch or wine.

Commercial action, in fact, has already been taken on the first named—frozen guava concentrate juice. For the Tropical Fruit Growers Assn., of Goulds, Fla., recently turned out 250,000 6-oz. cans of this product and is distributing them for a consumer-acceptance trial.

Technic With Purees

To prepare the purees indicated in the second, third, and fourth new products, either peeled or unpeeled fruit is employed (since the skin contains a high concentration of ascorbic acid, it should be used if free from blemishes).

The fruit is ground to a smooth consistency in a food blender. It is then pressed through several layers of cheese cloth to remove the seeds. A small amount of sugar may be added, with a bit of artificial coloring or juice from another fruit, such as antidesma. The final puree, frozen or heat-processed, is seen specially suitable for use as a spread, a condiment with meats, an ice cream topping or ice cream base, or as a punch base.

As for the vitamin powder, 4 oz. of the new product are termed sufficient to give three months' protection from scurvy. Tests in the laboratory showed a range of from 23.1 mg. of vitamin C per 100g. to a high of 531.3 mg.

It is the Seedling (unnamed) variety of guava, pink and yellow mottled, that scored this maximum. Highs for three other varieties were: Supreme (grafted) white, 284.6; Red Indian, ruby red to carmine, 212.4; and White Indian, white, 147.4.

The canned guavas are described as an attractive product similar to canned peaches. Either this form of the fruit or the puree can be employed commercially in bakery goods, as cake filling, or for upside-down cakes.

In the final assay of the commercial possibilities of the guava, one criticism of the fruit should be noted—that it is often highly pungent and perhaps excessively fruity in odor. However, these characteristics are being overcome with selective plantings to obtain less-odorous varieties.

Other tropical or semi-tropical fruits on which the University has conducted work of a similar nature include the West Indian Barbadoes cherry, the sapote, the sapadilla, the litchee, and some of the better known fruits such as the mango, papaya, and pineapple. The Barbadoes fruit is noteworthy in that it contains 2,000-4,000 mg. of vitamin C per 100g.

Aim for Market

Dr. Arthur L. Stahl, one of the original researchers on frozen citrus concentrates, is director of the university's food technology research laboratories. Giving prominent assistance in the development of the various new guava products were Margaret J. Mustard and Milton Kaplow.

"We are," states Dr. Stahl, "constantly thinking in terms of products that can be sold." Accordingly, the work of the laboratories has in great part been a collaborative effort with manufacturers.

Good Economics

Due to the comparatively low consumer acceptance of many of the tropical fruits named here, it has been a considerable gamble to ship the fresh products to distant markets. However, success of the new developments could mean a high and stable return, crop for crop.

Several companies have been specifically organized to exploit products prepared according to the processes and technics developed at the laboratories.

An additional project of the Tropical Fruit Growers Assn., named earlier, has been a fresh frozen lime juice concentrate put up in 6 oz. cans to make 1¼ qt. of limeade with the addition of five cans of water. The juice's only additive is cane sugar.

This product is marketed not only for home use but also for flavoring of fruit juices, frozen sherbets, ices and ice creams, mixed drinks, punches, pies, and pastries. Still another item is a 46 oz. can of limeade, consisting of lime juice, sugar, and water, ready for use. Fresh, tree-ripened limes are employed in both these products.

Chicken and Broccoli Operations, Too

Much work has also been carried on by the laboratories on other foods. One product development, Mama Jean's Toasted Chicken, now processed and marketed by the Chicken Kitchen organization, consists of a whole bird, fully prepared and seasoned, frozen

(*Turn to page* 161)

C. W. CRAWFORD
"Mere notification requires no prior testing."

F. N. PETERS, JR.
"Would destroy freedom in adopting research findings."

ROY. C. NEWTON
"There is a gap in the food law that should be closed."

Change in Food Law Poses Big Issues

You have much at stake. So you should be familiar with the issues discussed here in excerpts from papers presented at MCA conference

Highly significant factors involved in the chemicals-in-foods controversy were spotlighted at the fast-moving inter-industry conference held by Manufacturing Chemists Association on January 15.

Because food processors have much at stake in the effect of the controversy on future amendment of the Food, Drug & Cosmetic Act, FOOD ENGINEERING presents here excerpts of some of the papers read at the MCA conference. These point the finger at key issues.—The Editors

Why F&DA Wants Food Law Tightened

C. W. CRAWFORD,
Commissioner of Food & Drugs, Washington, D. C.

To appraise the need for new legislation on chemicals in food, we should consider just what provisions relating to this question are in the law now. From the text of the Federal Food, Drug & Cosmetic Act we see that it defines any food as adulterated: (1) If it contains a poisonous or deleterious substance which may render it injurious to health. (2) If it contains any such substance that is not required in the production of the food or that can be avoided by good manufacturing practice. (3) Where it is so required or cannot be so avoided, if it exceeds the tolerance prescribed by the Federal Security Administrator after public hearing.

Reading the statute impresses one with the clear intent of Congress to go further than merely insuring that no single food will itself carry enough poison to jeopardize the health of the consumer. The purpose was to safeguard the nation's food supply so that the over-all quantity of toxic substances—in all the items that make up the varied diet characteristic of American people—will be held at safe levels.

With this background, let us try to define the question before this conference. Certainly the terms "chemicals in foods," "new chemicals in foods", and "dangerous chemicals in food" all lack much in precision. It seems to us that the real question is on the use in food of any substance of whatever nature (*whether in lay parlance it is a chemical or not*), when that substance has not been adequately tested (*either through human experience or by all reasonably applicable laboratory and clinical procedures*) to show either that it is not poisonous or deleterious; or, if it is and it is required in the production of a food, that it can be safely used.

This is the relatively narrow but highly important area in which we believe that neither the Federal Food, Drug & Cosmetic Act—nor any other law—affords adequate protection to the public health.

That the dramatic equivalent of the elixir sulfanilamide disaster of 1937 that cost more than a hundred lives has not occurred in the food field speaks volumes, first, for the conscientiousness of these industries generally, and second, for the providential luck of the fringe operators—and the public. We have had some narrow escapes.

Much has been said about the impossibility of guaranteeing the absolute safety of any food additive for all people under all circumstances, and about the toxicity of nearly every common food to hypersensitive individuals. The point is well taken. But this does not mean that nothing should be done toward setting up legal safeguards to minimize other and more avoidable dangers. A practical, common-sense solution can be worked out if the nature and scope of the problem are clearly recognized and if a constructive approach is followed.

Leaders in the food and chemical industries have set some practical guidelines. In their investigations of

F. L. GUNDERSON

"Nutritionally valuable chemicals are of tremendous benefit."

the prospective use in food of chemicals of unknown safety, they have used every reasonably applicable test. This procedure is not only highly desirable; it is highly expensive. We believe that what is being voluntarily done by the majority should be required of those who are less conscientious.

The objective would not be accomplished by the suggested amendment to provide that the Food & Drug Administration be notified of the intent to add to any food an ingredient that has not previously been used in that food. Mere notification requires no prior testing.

Much criticism has been directed at the amendment proposed in the Miller bill, H.R. 3257. I must accept personally all blame for any imperfections of that bill. I drafted it, rather hurriedly, at the request of the Delaney Committee, of which Representative Miller is a member. In presenting it to the Committee, I emphasized the fact that it was purely tentative and that it could be improved. I used as a general pattern the new drug section of the law.

Let me illustrate how I envisioned the general working of the bill, regardless of the sufficiency of its language. A manufacturer finds that certain kinds or classes of food can be improved by adding a chemical. That chemical is not required in the production of those foods. Nor is it generally recognized by qualified experts as having been adequately tested to show that it is not poisonous or deleterious.

The manufacturer tests the chemical by all reasonably applicable methods to supply this information.

If he believes the tests show that the chemical is not poisonous or dele-

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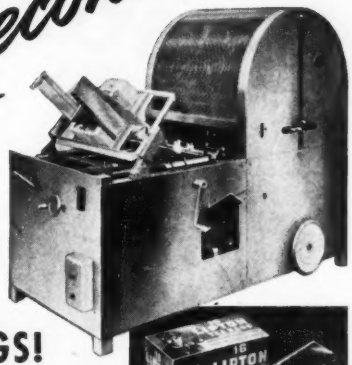

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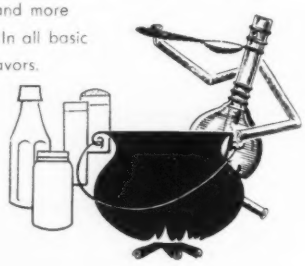

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terious, he submits all his data with an application to the Federal Security Administrator for use of the chemical in food. If the Administrator agrees with him, the application is made effective. So far as any provision of the law concerning poisonous or deleterious substances is concerned, the applicant can then use the chemical or sell it for use in food of any kind. Other provisions of the law on adulteration and misbranding would of course have to be observed.

If the Administrator believes the data leave a reasonable doubt as to whether the chemical is poisonous or deleterious, the applicant will be so advised. If he wishes, the applicant can do additional work on the point in question or he can demand a formal hearing. If the Administrator is still unconvinced, he issues an order refusing to permit the application to become effective. The applicant can appeal the order to the Federal courts, which have power to set it aside if it is unreasonable or abitrary.

In drafting the Miller bill, an effort was made to fix responsibility for compliance upon the firm or person who sponsors the use of a chemical in food or in circumstances where it is likely to contaminate food. If the language is not clear in this respect it should be changed to make it so.

I did not include a so-called grandfather clause in the bill parallel to that in the new drug definition because I did not regard the problem as parallel. This clause excluded from the definition those drugs that had been on the market before the law was passed.

Several factors persuaded me to follow the general pattern set up by the law for new drugs. These provisions have worked smoothly and satisfactorily since 1938, during which time applications have become effective for nearly 6,000 new drugs. Among these are the many so-called wonder drugs which constitute the most spectacular progress in drug therapy of all time.

Miller Bill Would Stymie Research

F. N. PETERS, JR.,
Vice-President, Quaker Oats Co., Chicago

Legislation has been proposed which would destroy the freedom of management to use its best judgment in adopting research findings. In March, 1951, Representative Miller introduced a bill, H.R. 3257, the principal provisions of which are as follows:

A manufacturer must file an application and obtain permission from the Federal Security Administrator before using any substance designed to alter food in any way—if that substance "is not generally recognized

. . . as having been adequately tested to show that it is not poisonous or deleterious." The application must be accompanied by a great deal of technical information. It may be denied for several specific reasons, but attention is called to the final basis for rejection. The Administrator may issue a denial if "on the basis of any information before him with respect to such chemical, he has insufficient information to determine whether such additive is safe for use."

An appeal from the ruling of the Administrator may be made to a circuit court, whereupon the Administrator will file a transcript of the record upon which refusal was based. The bill then states, "The finding of the Administrator as to the facts, if supported by substantial evidence, shall be conclusive."

This legislation, if it becomes law, will destroy a manufacturer's freedom to make changes in his products. In the first place, any change in any food, whether made by addition of a new ingredient or whether produced by a new method of processing, would be submitted by the prudent manufacturer to the Federal Security Administrator for approval.

It will be said that the intent of H.R. 3257 is to require proper-use approval only if new or untried additives are involved. That may be the intent today, but the prudent man will read the law and reason differently. If his proposed food has a new appearance, flavor, texture or odor—whether because of new ingredients or new processing methods—such food contains chemical additives as defined in this bill. If it is new, it certainly is not "generally recognized" as either safe or unsafe. It has not been recognized, period. Therefore, the prudent manufacturer will submit every new food product for approval before marketing.

Thus, the real authority to adopt research discoveries is removed from the manufacturer and transferred to the Federal Security Administrator, an appointee of the President. No clairvoyance is needed to know what such a transfer of authority will do to research. Even if financial support were not withdrawn, the effect on the morale of research men would be no less calamitous.

Under this bill, the ultimate responsibility for the absolute safety of every new food is placed squarely on the Federal Security Administrator. This responsibility is too great for any individual. Acceptance of a new product means nothing to the Administrator financially. He gains no competitive advantage. He cannot claim the doubtful glory of being the inventor. All he can gain is more responsibility—responsibility for what will happen when any approved food is eaten by any one of 150,000,000 persons.

Under such circumstances, he will do what any man would do. He will approach the question of decision with a negative attitude. His degree of negativity will increase in proportion to the breadth of the new discovery. Progress through research and a negative attitude toward change are not compatible.

This suggests a corollary point. If an improvement is revolutionary, it is probably patentable. If it is covered by patents, little pressure will be put on the Administrator to approve the use of the invention, except by its owners.

The normal reluctance of the Administrator to assume added responsibilities will be supported by the negative, or, at best, the indifferent attitude of those in industry not in position to capitalize on the invention. It is not inconceivable that the price of acceptance might be surrender of patent control. If protection under patents resulting from research is weakened or jeopardized, another incentive for support of research is destroyed.

Suppose a manufacturer develops a change that lowers his costs, but in his opinion, does not affect nutritive qualities. Will the Administrator quickly approve a change if the only benefit is to the manufacturer?

Amendment Needed To Close Gap in Law

ROY C. NEWTON,
Vice-President, Swift & Co., Chicago

Shortage of time prevented Dr. Roy C. Newton from presenting his complete statement at the MCA meeting. So Dr. Newton mailed copies of the statement to those who attended the meeting. In his letter of transmissal he said, in part:

"There is a gap in the present federal food law which should be closed by amendment. For foods that are as yet unstandardized, the present law places the burden on the Food & Drug Administration to prove that a substance is poisonous before its use in food can be prevented. A simple change in the law to place the burden of proof on the prospective user is essentially all that is needed.

"I wish to make it perfectly clear that I have taken no position either in support or in opposition of any particular bill."

The following is an excerpt from Dr. Newton's statement:

The real issues, and the only issues that are worth discussing in connection

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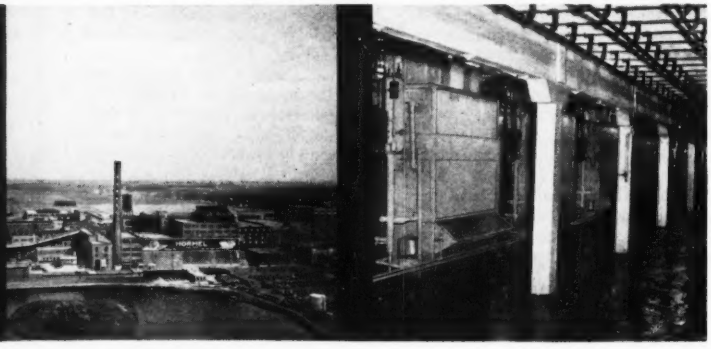

On the job at George A. Hormel & Company plant at Austin, Minn., Carrier Refrigeration Compressors, Cold Diffusers and other equipment are contributing to the production of constantly superior meats.

with this problem at the moment, relate to pre-testing of new and unusual substances proposed for food. I would like to list them in the order that they occur to me:

1. Shall the unusual products proposed for use in food (be it natural or synthetic) be subjected to animal testing before trying them out on the public? It is my experience that no one is bold enough to stand up in meeting and suggest that all these unusual substances be tried on the public without pre-testing.

Many, however, will have certain qualifications. They will object to the long test period. They will object to the levels that are included in the test. They will object to the interpretation of results. They will object to delegating authority to a government body to serve as a referee on the adequacy of such tests.

2. Should such pre-testing be compulsory?

There are many who will laud the ethical standards of the chemical industry and the food industry in an attempt to show that they are reliable and intelligent enough to make all the tests required without compulsory action. A moment's reflection on the part of anyone should convince him that this is not true.

3. What constitutes a good and sufficient test?

It is my own opinion that there is a lot yet to be said on this point. The Food & Drug Administration has attempted to outline the test requirements. They have recognized that each individual case calls for some modification. And it is possible that, as the years go on, we will arrive at a clearer understanding of what should be required to protect the public.

4. Who should decide when the testing has been adequate and that the product is harmless?

There are those who have proposed establishment of an unbiased, non-government scientific body to referee these questions. It seems obvious to me that such authority can only be delegated to a government appointee. That brings us right back to the present regulatory bureaus in the government. One of these is the Meat Inspection Division of the Bureau of Animal Industry. This regulatory bureau now has all of the authority to require pre-testing.

The Food & Drug Administration has authority to require pre-testing of anything to be added in those foods on which standards and definitions have been promulgated. It does not have authority, under the present law, to require pre-testing on a proposed additive in a non-standardized food. Nor does it have authority to stop the use of that additive unless it can prove that the additive is deleterious.

Since this is obviously an impossibility—as the Food & Drug Administration could not maintain a staff large enough to test all of the chemicals that can be thought up by the manufacturing chemical industry and the entire food industry—it seems only

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logical that the burden of proof should be reversed and put upon the industry rather than upon the government.

Chemicals Improve Nutritive Values

FRANK L. GUNDERSON,
Vice-President, Pillsbury Mills, Inc., Minneapolis

Nutritionally valuable chemicals deliberately added to several staple foods are of tremendous benefit to the health of men, women and children throughout this country.

Without the iodine of iodized salt, 'teen-aged girls might still have unsightly enlarged necks and be seriously unhealthy with endemic goiter. Without vitamin A as added to margarine, there might be widespread xerophthalmic injury to eyes and stunting of growth. Without vitamin D added to evaporated and bottled milk, rickets with its bowed legs and "chicken-breasts" might still be commonplace. And without the thiamin, niacin, riboflavin and iron, provided by enriched flour and enriched bread, the ill-health of beri-beri, pellagra, and simple anemia would still be afflicting many millions more than are now suffering these conditions.

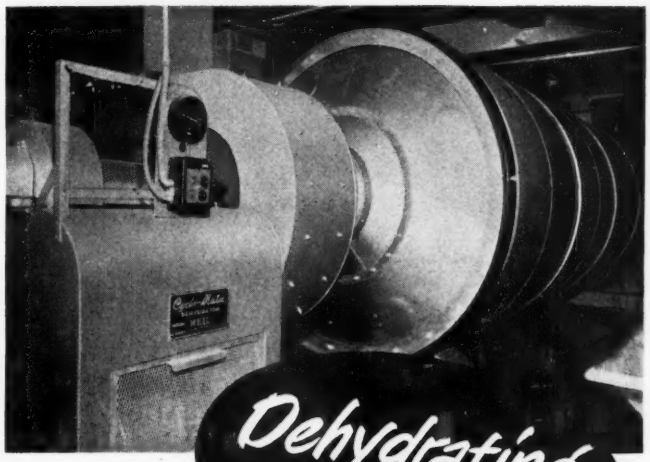
Today there is no longer any valid excuse for endemic goiter. But ignorance, indifference and misconceptions still permit goiter to occur needlessly in hundred of thousands of children in the U.S.A.

Xerophthalmia and the blindness which accompanies this type of malnutrition are almost completely eliminated nowadays. This is partly because of improved margarine. Manufacturers of margarine are doing many millions of citizens an important nutritional service, and are setting a splendid example for the food industries as a whole, by voluntarily fortifying more than 98 percent of all margarine with vitamin A.

Due to vitamin D fortified evaporated and bottled milks, which are available like the other nutritionally improved foods to an increasingly high percentage of our population, cases of florid rickets are now a rarity.

Malnutrition caused by too little of certain "B vitamins" and iron was widespread 20 years ago, but has been greatly reduced in the last ten years through food products from grains. The flour, bread, corn meal and cereal breakfast-food *enrichment program* has fortunately brought about marked improvements. Beri-beri, pellagra and severe nutritional anemia are much less prevalent since major foods from grains were enriched starting in 1941.

Still further improvements and wide-



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The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature Automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY

312 WILSON, SO. NORWALK, CONN.

spread betterment of nutrition can be expected, especially if the mode of operation is made even more automatic. With continuation and expansion of these sound practices, the growth of children, the vigor of adulthood, and the well being of old age will continue to set new and more satisfactory records.

—End—

Frozen RR-Diner Meals

—Continued from page 53

operation by Reynolds Aluminum Co. These are wider and shallower than similar packages used by the home freezer.

Freezing facilities include a 28-deg.-F. chill room where each cooked product—on trays—is first brought down in temperature without excessive icing. Then the product is rolled into a −50 deg. F. air blast room for deep freezing and finally into a −10 deg. F. room for holding and storage.

Deep freeze storage cabinets of a special design will be installed on all diners to carry enough frozen meal components to last a diner a safe margin beyond its longest round trip. And while the main meal supply location will be the Chicago CFC (control food center), sub-commissaries will be set-up in El Reno, Okla., and Minneapolis.

No processing, however, will be done in the sub-commissaries—they'll merely have sizable deep freeze storage facilities which will be replenished from Chicago.

Special Foods Developed

Since nearly everything except coffee and some high water-content fruits has been slated to be pre-prepared, the company had to develop a number of frozen menu items for which there was very little prior art to guide the processing.

One example is a very crisp and fresh tasting Waldorf salad. Another is a collection of very palatable French pastry. Bread and also breakfast sweet rolls will likewise be frozen items.

Diners on a trip using the new service will be afforded more selections than was possible with the conventional system. At least 15 different lunch and dinner menus will be stored in the diner freezer. And the beef courses will accommodate the patron in his prerogative to specify well-done, medium, or rare.

Thawing time of a conventional order in the new diner will run 18 to 22 minutes. However, several items on

FOR
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MODERN
HANDLING
EQUIPMENT
You've got to
Buy CLARK

★
MOTOR—Designed for **CLARK** for the specific power requirements of industrial use. Fuses protect both motor and circuits against damage.
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STEERING AXLE—Pivoted—all four wheels **always** on the ground: better traction, better steering, utmost stability.
★
DRIVE AXLE BY CLARK—Regular Hiway-Truck-Type Clark axle—the best that can be said of any axle.
★
AUTOMATIC ACCELERATION as employed on **CLARK** Electrics takes out the human error—**no jerking**—
★
DIRECTIONAL LEVER on **STEERING COLUMN**—greatly simplifies operation, increases maneuvering speed and fast getaway.
★
BRAKES—HYDRAULIC—Smooth, positive action for safe operation—ruggedly built for long-lived efficiency.

To meet the varying needs of users, CLARK electric fork-truck motors are designed to operate efficiently on any power supply from 30 to 48 volts. CLARK'S standard power supply is 36 volts. These trucks are designed with perfect balance among all components and incorporate a new method of motor winding which provides more efficiency than has ever been offered in an industrial truck motor . . . There have been many technical changes from year to year in CLARK machines, but there has never been any change in CLARK'S 30-year purpose to give you the best VALUE your money can buy—and there never will be.

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS
AND POWERED HAND TRUCKS · INDUSTRIAL TOWING TRACTORS

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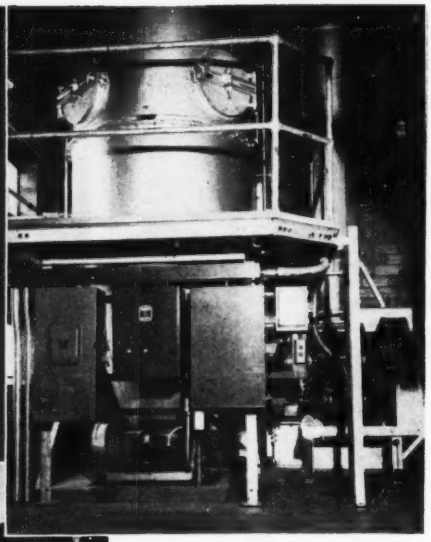
UNLOAD FLOUR FROM BAGS OR BULK CARS

WITH AIRVEYOR®

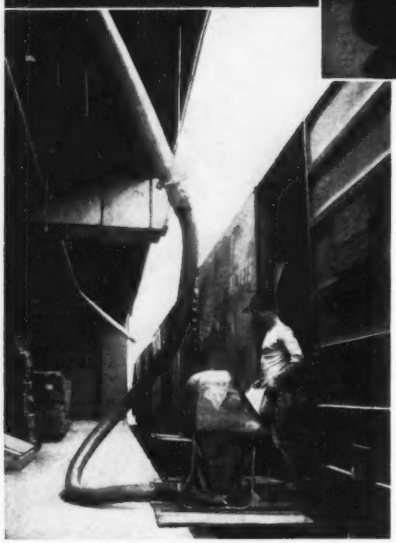
•

Safely Simply Efficiently Economically !



The heart of the Airveyor . . . Filter, separating material from conveying air, with 100 percent visible retention of dust . . . exhauster on right, background.

Attaching flexible metal hose to hopper of a Trans-Flo bulk car, unloading semolina.



Airveyor unloading semolina from bags shipped in box car. Bags are opened and contents dumped into portable hopper, to which the same flexible metal hose, used for unloading bulk cars, is attached. As bags are removed adjacent to the car door, the hopper is moved further back into the car, for more efficient unloading.

It doesn't matter whether you receive flour in bags or bulk, the Airveyor can be adapted to handle it in either manner . . . efficiently, rapidly, and without loss of material.

The Airveyor will unload and convey, in one operation, from cars to storage, or direct to process, if desired. The system can be so arranged as to blend while reclaiming from storage . . . can be designed to convey to any number of delivery points, in a dustless, sanitary manner. No mechanical conveyors need be used . . . no bothersome cleaning . . . the system is self-scouring.

During the past few years the Airveyor has been installed for the handling of flour, and other food products, in 16 plants, with a total of 31 systems in operation. In addition to this, there are under construction, 13 systems for installation in five plants.

If costs for conveying flour and other similar products have been cutting into profits . . . if labor and maintenance costs have been climbing . . . you'll find it profitable to call in a Fuller engineer. Chances are he can show you how minimum expenditure can bring you a conveying system that means maximum operating efficiency, and consequent improvement in profits.

Fuller

FULLER COMPANY, Catasauqua, Pa.
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DRY MATERIAL CONVEYING SYSTEMS AND COOLERS—
COMPRESSORS AND VACUUM PUMPS—
FEEDERS AND ASSOCIATED EQUIPMENT

A-127

the menu will usually be pre-inserted in the thawing oven and it is expected that most servings will be made within a few minutes after the order is placed.
End (Resume reading on page 54)

Better Grape Juice

—Continued from page 55

2½ in., horizontal, perforated pipe uniformly distributes the hot juice over the 5½x12-ft. precooler.

Further chilling of the juice to 28 deg. F. comes next. The juice is pumped to the top of a cabinet-type cooler, where a distributing pan uniformly feeds it to six vertical, stainless steel, ammonia-refrigerated plates. Foaming of the film-filling juice is reduced as it is discharged onto a horizontal stainless plate. This plate, which is on a slight pitch, feeds the cold juice into a trough that ranges in depth from 6 in. at one end to 12 in. at the other.

Tartrates precipitate from the juice during eight weeks of storage in twelve 35,000-gal. cedar casks, which are coated on the inside with paraffin. These casks are located in a 28-deg. F. cold storage room. Suspended over each cask are ultra-violet lamps that keep the surface of the juice sterile.

Finally, the juice is racked off the settled tartrates.

Low-Temperature Concentrating

De-tartrated juice then goes to a low-temperature, single-effect, multi-tube, falling-film type evaporator. Here, the juice is continuously concentrated to about 50 deg. Brix under 28½ in. of vacuum and at 90-95 deg. F. Vacuum is created by a two-stage, steam-jet system. Heat to vaporize the juice is supplied by steam. Vapor from the juice is condensed by a cold water spray and pumped to waste. Juice is concentrated at a rate of about 600 gal. per hour.

By adding fresh juice, concentrated juice is diluted in a stainless steel blending tank to about 30 deg. Brix, and sugar is then added to increase the solids to approximately 47 deg. Brix, depending upon the original sugar content of the juice.

Blended juice concentrate is now chilled to 30 deg. F. in two 500-gal. ammonia-jacketed tanks. The juice is next filled, 6 oz. to a can, by an 18-head rotary unit.

Cans are finally sealed, coded, and automatically packed 24 to a case. After the cases are glued and sealed, they go to a –40-deg. F. blast freezer. Storage of the frozen grape juice concentrate is at –20 deg. F.
End (Resume reading on page 56)

After 2 Years—

REGAN BROTHERS BAKERY, Minneapolis, says —— THE MULTI-CLEAN METHOD is TOPS in Floor Care

All wood floors in this high production bakery were treated with Multi-Clean Bakery Floor Preserver two years ago. Since that time, only heaviest traffic lanes have needed touching up and these not oftener than every four months. Floors subject to normal foot traffic have needed no refinishing, and floors in the sugar and flour storage rooms will last another two to three years without refinishing. This record of the wearing qualities of Multi-Clean Bakery Floor Preserver has cut its cost down to less than 1c a year per sq. ft. per coat. Other benefits have been—

Better Sanitation: Cracks and crevices completely sealed against dirt and infestation. The hard, lustrous, non-slip finish resists fats, oils, water, sugar and alkalies . . . withstands the punishing weight of bakery trucks . . . is easy to clean . . . safe to work on.

Minimum Maintenance: Dry sweeping keeps floors clean, safe and attractive . . . no more tedious hand scraping since jellies, raisins and other sticky foods do not adhere to the surface. Weekly damp mopping completes all other cleaning requirements. An occasional steel wooling with a Multi-Clean Floor Machine maintains the floor's lustre.

Easy Touch-Up And Refinishing: Overlaps do not show and whether refinishing an entire floor or just touching up traffic lanes, the rapid drying finish is ready for use in 90 minutes . . . no time lost in production schedules.

The MULTI-CLEAN METHOD

MULTI-CLEAN BAKERY FLOOR PRESERVER penetrates the fibres of wood floors, preserving them against water, fats, alkalies, sugars, etc. Highly resistant to mold and bacteria.

MULTI-CLEAN FLOOR MACHINE for scrubbing, waxing, buffing, polishing, dry cleaning and many other floor maintenance jobs.

MULTI-CLEAN VACUUM for wet or dry pick-up. Safe, portable and quiet. Attachments for every cleaning need.

ENJOY THE BENEFITS of Multi-Clean Bakery Floor Preserver and the Multi-Clean Method in your plant. Mail coupon today for more information.

Free! FLOOR MANUAL

"Your Floors and How to Maintain Them" is a 40-page illustrated booklet prepared by Multi-Clean to answer all your floor problems and save you money on floor care. Send for your copy today.

MULTI-CLEAN PRODUCTS, INC.
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Dept. FE-3, St. Paul 1, Minn.

MULTI-CLEAN® PRODUCTS INC

Please rush my FREE maintenance manual for all types of floors, also information on items checked:

☐ FLOOR MACHINE ☐ ALL-PURPOSE SCRUBBER
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City.....*Zone*...*State*.....
3-52

EVERY MULTI-CLEAN PRODUCT CARRIES A 100% GUARANTEE!

For more information, use post card on last page.

NEW PACKAGES & PRODUCTS

User Opens Top End

—then places pie crust ingredients in mixing bowl. Adds 3 tablespoons cold water, mixes dough lightly with fork. Divides into two equal parts and lines bottom of 9 in. pie plate with one part.

Then Opens Bottom End

—which contains beef pie ingredients consisting of beef, potatoes, carrots, tomato puree, cereal, salt, peas, celery, flavoring, monosodium glutamate, water, and caramel coloring.

Fills Crust-Lined Plate

—with the beef and vegetable mix. Covers with remaining pie crust and pops into oven.

Serves Piping Hot

—after baking approximately 15 to 20 min. in a 400 deg. oven, or until nicely browned.

Vegetable-Beef Pie Marketed in Composite Package

One of the latest innovations in the packaging field is the two-can integrated package of vegetable-beef pie mix offered by Krey Packing Co., St. Louis.

Called "Kri-Pi", the new product is packaged in a dual container, with crust dough under vacuum in the top section and the pie filling below. With the cooperation of National Can Corp., New York City, this composite package was developed after two years experimentation. To achieve the desired results, the prepared crust mix is vacuum-packed separately. A deeper can, but of equal diameter to fit neatly below the mix container, holds the vegetable-beef mix. These are bound together by scotch tape at the joined edges, giving a strong one-unit package.

Can size and fill are carefully gaged to give ingredients for a complete, simply-prepared 9-in. pie. The top can holds 9-oz. of crust makings and the lower component contains 1¼-lb. of filling mix.

A colorful label designed to cover the two cans was designed by the company and its agency, Ruthrauff & Ryan. To achieve a smooth label application, there are a line of slots in the label at the point of can juncture. Labels are supplied by Epsom Lithographing Co., Omaha.

For More Data on Package Supplies Named Used Reader Service Card

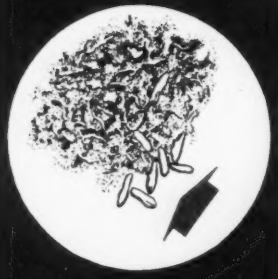
For superior glass performance

—ARMSTRONG

Armstrong's Glass Containers measure up to every requirement of finest quality glassware. They're skillfully designed to improve the appearance of your package—precision-engineered to perform better on your filling lines. You'll find, too, that this durable glassware meets all the demands of service conditions in the field.

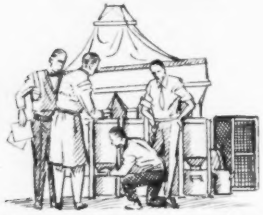
Your near-by Armstrong representative will be glad to give you further information on our *complete* packaging service. Chances are he can help you with a practical answer to *your* packaging problems. Contact him today or write direct to Armstrong Cork Company, Glass and Closure Div., 4203 Prince St., Lancaster, Pa.

Packaging Headquarters for Metal and Artmold Plastic Caps, Corks, Crowns, and Du Pont "Cel-O-Seal" Bands



SEPARATION NO. 178

BONE FROM FLAKED CODFISH



The separation of bone from flaked codfish was the *178th specifically different* dry separating problem solved by using Sutton equipment to effect *a difference in specific gravity through air-flotation.* From allspice to wheat germ, from almonds to snuff, Sutton Separators and Stoners are doing a distinctive job throughout the food processing industry. They may be the answer to your salvaging and grading problems, too. Upon request, general information and literature on all S S & S equipment will be furnished immediately. (Address Dept. A)

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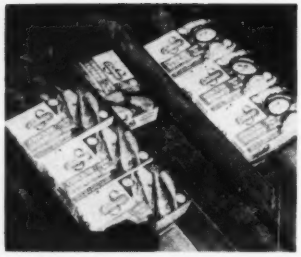
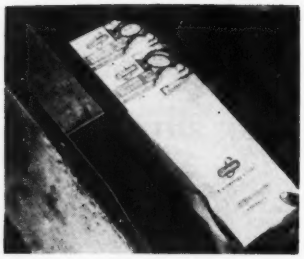
1031 SOUTH HASKELL • DALLAS, TEXAS

SALES AND SERVICE: DALLAS, COLUMBUS, GA., NEW YORK, PITTSBURGH, CHICAGO, MINNEAPOLIS, JACKSON, MICH., DES MOINES, SAN FRANCISCO, TWIN FALLS, IDAHO, FORDER, WINNIPEG, CANADA, SAO PAULO, BRAZIL, LONDON, ENGLAND

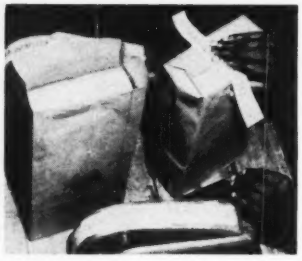
SUTTON, STEELE & STEELE, INC.



1 AFTER FREEZING, cartons of the same chicken parts are placed in blocks of six in a metal chute.



2 MOUTH OF BAG is placed over end of chute. Then cartons readily slide into bag.



3 BAGS ARE CLOSED. Printing on bags and on vari-colored tapes identify chicken parts.

4 FOUR BAGS of six consumer units each are packaged in shipping container, labeled, and sealed.

Mixed Cartons for Frozen Chicken Parts

A new multiple-unit package for the distribution of frozen chicken parts has been developed by Union Bag & Paper Corp., New York City, for C. A. Swanson & Son, Omaha.

Formerly, the company packed 24 cartons of frozen chicken parts in a single shipping container. The processing method is such that the same parts of the chicken are handled on the assembly and freezing line at the same time. Thus, each unit contained the same parts of the chicken—that is, 24 legs, 24 wings, etc.

But wholesalers reported that many stores would not take 24 cartons of the same chicken parts. This necessitated breaking the shipments down to units of six or twelve by the wholesaler.

To overcome this, a bag was developed to hold six cartons of chicken parts. Made from wet-strength paper, the bag is specially treated to prevent cartons from freezing together while in storage.

This system of multiple-unit packaging simplifies the handling for the distributor. He simply takes out the multiple unit packages, then repacks them in the container with the quantity and mixture of chicken parts required by the individual stores.

For Package Data Use Reader Service

Berry Basket Goes Plastic

A new plastic strawberry basket has made its appearance on the Pacific Coast. It is molded of an acetate plastic supplied by Celanese Corp. of America, New York City, and is manufactured by Pacific Plastics Products, San Francisco.

Known as "Pak-A-Pint", it is made of a refreshing green plastic, latticed like the traditional wood basket. Lightweight and economical, it is sturdy enough to stand up under rough han-

dling. One feature of the basket is that it is splinter-free, with no rough or jagged surface to injure hands of packers. It has reinforced bottom corners with beaded grips to insure safe stacking. Dimensions are 4½x 3½x2¼.

To gain added impetus in the cam-strawberry box, it can be used for other small fresh fruit.

For Package Data Use Reader Service

Cones for Home Use

With freezers and refrigerator freezing compartments becoming standard fixtures in the home, housewives are buying larger containers of ice cream and storing them for use when wanted.

Taking advantage of this trend, Illinois Baking Corp., Chicago, is conducting an extensive advertising campaign through newspapers, radio, and television for its "Safe-T" cones and cups for home use.

To gain added impetus in the campaign, colorful take-home cartons have been designed to stimulate sales through attractive shelf displays. They are called "Rainbow Pak" assortments.

One side of the cellophane-wrapped chipboard carton displays the cones or cups in a rainbow of colors, including chocolate brown, strawberry pink, golden vanilla, and mint green. On the other side, a cone or cup is shown filled with strawberry colored ice cream. A large blue circle carries product identification in yellow letters. Other lettering is blue on a white background. The side, top, and bottom panels are in white and yellow on a deep blue background. Stressed are the spill-proof and drip-proof features of the product.

Each box contains 12 cones, or cups, made from an exclusive recipe.

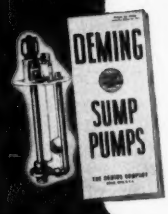
Cartons are furnished by Empire Box Co., Chicago, and Paramount Carton Co., New York City.

For Package Data Use Reader Service

These sump pumps embody the latest and most modern developments such as:

- Positive alignment of all rotating and guide bearing parts
- Flanged column pipe connections
- Motor mounting for standard NEMA type "C" flange
- Adjustable semi-open type impeller
- Heavy duty construction
- Discharge sizes 1 to 10 in. pipe
- Capacities up to 3000 G.P.M.
- Discharge heads up to 140 feet
- Lengths up to 21 feet
- Motor horsepower up to 75 HP.

Send for DEMING SUMP PUMP Bulletin



THE DEMING COMPANY
556 Broadway, Salem, Ohio
Send copy of illustrated Bulletin No. 4600-A on Deming Sump Pumps.

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COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

the ABC's of Flavor Perfection

by P&S

A **ALMOND - COCOANUT IMITATION**
A subtle blend of two old favorites, as succulent as the nut meat themselves.

B **BUTTER IMITATION**
Wherever a "rich, buttery" note is desired, here is the flavor for you. Easy to use and economical too.

C **CUSTARD IMITATION**
A delicate smooth flavor that makes pleasurable tasting.

EACH flavor is available in heat stabilized form or in the proper base and in a concentration to meet your particular food product requirements whether it be:
cake or cookie dough,
icing or cookie filler,
pudding, pie filler, candy . . .

SEND for SAMPLE TODAY!

GENTLEMEN:
Please rush sample of
☐ A ☐ B ☐ C
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Address.....
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Midwestern Office: 173 W. Madison Street, Chicago 2, Ill.
Representatives: Milwaukee - Los Angeles
Canadian Office: Polak & Schwarz (Canada), Ltd.
914 Danforth Avenue, Toronto, Ontario, Canada

New Products Feature New Package Design

With its introduction of mayonnaise and salad dressing, Pacific Cheese Div. (Los Angeles) of The Borden Co., New York City, is not only adding two entirely new products to its present line but is initiating a package construction that is a new departure in this product field.

Outstanding is the stacking feature made possible by the flat, grooved top and a special stacking ridge built around the bottom of the container. The wide-mouthed jars, which are reusable as refrigerator containers, come in ½ pt., 1 pt., and 1 qt. sizes.

Developed after extensive research, these products are being manufactured in the company's completely modern plant in Los Angeles. At present, they are being distributed in 11 Western States.

Labels and closures carry the Borden logotype and Elsie-the-Cow emblem. The mayonnaise label and top carry a distinctive blue imprint, while the salad dressing design is in red. Ample room has been left on the caps for retail price stamping.

Jars are supplied by Glass Container Corp., Los Angeles, and Owens Illinois Glass Co., Toledo. The latter also furnishes the closures.

For Package Data Use Reader Service

Non-Frozen Orange Juice

Using the same process that enabled Andersen's Foods, Inc., Santa Barbara, to win the 1951 FOOD ENGINEERING Award for outstanding achievement in food technology (pp. 67-70, June 1951 FE), the Bordo Products Co., Chicago, is now introducing an unfrozen concentrated canned orange juice.

This juice is said to retain the flavor, color and texture of the natural product. It does not require refrigeration on the store shelf.

The process was developed by Dr. William McK. Martin of the James Dole Engineering Co., Redwood City, Calif. The orange juice is now being test-marketed after a year of experimental processing in a pilot plant in Winter Haven, Fla., under supervision of W. F. & John Barnes Co., Rockford, Ill.

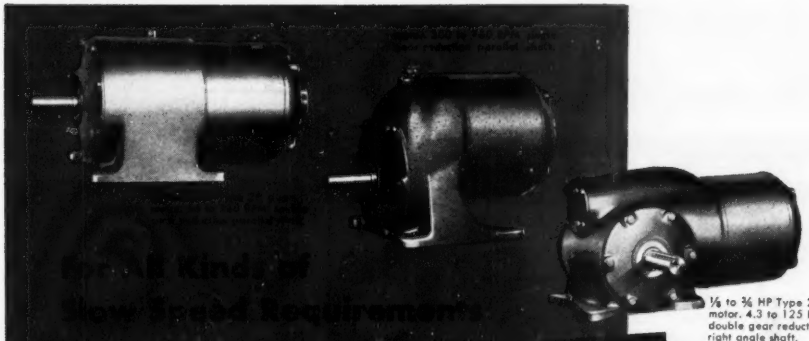
This process differs from conventional canning methods in that the product is rapidly sterilized and cooled before it is sealed under sterile conditions in the container. An intricate system of automatic controls helps insure safety and sterility throughout the process.

The product is now being distributed in 6-oz. cans. To prepare for consumption it is necessary only to add three parts of water to the juice.

For Equipment Data Use Reader Service

Peeled Cocktail Shrimps

National distribution is now in progress on "Norwegian Beauty" peeled cocktail shrimps, a product of Neptune Canning Co., Stavanger, Norway. The product is being handled



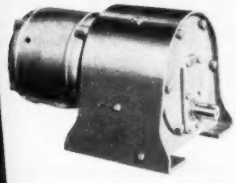
1/8 to 3/4 HP Type 2R gear motor. 4.3 to 125 RPM double gear reduction right angle shaft.

Specify

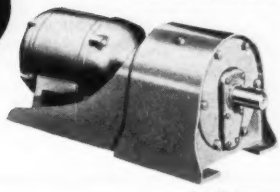
Century GEAR MOTORS

For All Kinds of Slow Speed Requirements

Rugged, Quiet, Long Life Operation



1 to 50 horsepower, gear motor.



1 to 50 horsepower, all motor type gear motor.

There are dozens of reasons why Century gear motors assure satisfactory performance day after day. Here are a few of them:

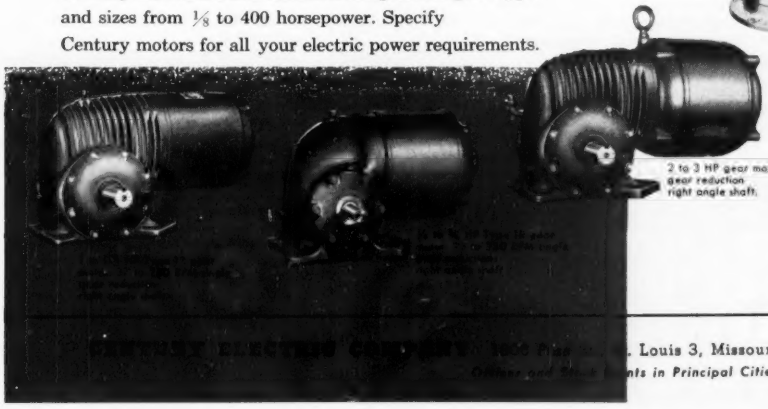
Simple design, coupled with accurate machining and rugged construction, produces a rugged unit that stays in alignment.

Precision gear cutting assures quiet operation.

Streamlined design provides improved appearance and smooth easily cleaned surfaces inside and out.

Century Gear motors are available in a wide range of types and sizes from 1/8 to 50 horsepower—in a variety of speeds. Other Century motors are available in a complete range of types and sizes from 1/8 to 400 horsepower. Specify Century motors for all your electric power requirements.

1 to 50 horsepower, vertical all motor type gear motor.



2 to 3 HP gear motor. Single gear reduction right angle shaft.

>692

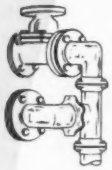
Louis 3, Missouri

...nts in Principal Cities

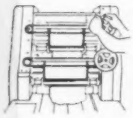
Century C MOTORS

Where in the *food* world

can you use TEFLON*?



Do you pump or valve vinegar, alcohol, syrups, extracts, solvents, concentrates, fruit juices, milk, beer, etc.? Try Chemiseal Packings made of Teflon by United States Gasket Company. They won't freeze up like other packings on such difficult solutions. They can't be attacked by or contaminate the product in process. They are completely chemically inert—and they do not need lubrication. No danger of oil or grease getting into the process.



Do you run a Bakery? Try Teflon-covered Dough Rolls; sheets, tape, for working surfaces; oilless bearings for machinery. Teflon sticks to nothing. Bakers report $20 to $50 per day savings—using Teflon header rolls on dough sheeters. They reduce or eliminate flour dusting.

Do you use stainless steel or glass piping? Try Chemiseal Gaskets, Expansion Joints, Adaptors and other accessories, made of Teflon, for all types of glass and metal pipe connections. They are inert to every acid, caustic and solvent found in the food industry. They withstand temperatures up to 500°F. They are strong, resilient—reusable when lines are broken for cleaning.

United States Gasket Company fabricated Teflon, is available in sheets, tape, engineered packing, cut and molded gaskets, covered rolls, etc., to solve many food processing problems.

Ask for catalog or send specific information on your requirements.

*duPont's trademark for its tetrafluoroethylene resin

UNITED STATES GASKET COMPANY

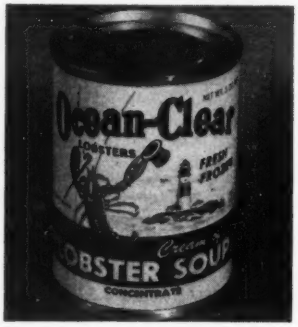
FLUOROCARBON PRODUCTS DIVISION

FABRICATORS OF "TEFLON", "KEL-F" AND OTHER FLUOROCARBON PLASTICS

CAMDEN 1 NEW JERSEY

by Wm. A. Camp Co., New York City.

The seafood is packed in 1½-oz. round tins and 2½-oz. conventional tins. The label is attractively designed, being printed in several colors and featuring illustrations of the product in cut-away form.



Frozen Lobster Soup

Innovation in the frozen food line is a fresh-frozen cream-of-lobster soup concentrate sold under the brand name "Ocean Clear" by Consolidated Lobster Co., Inc., Gloucester, Mass.

This is the company's first venture into the frozen food field, with other items scheduled to follow.

The soup is packaged in a 5-oz. can to which a double quantity of fresh milk is added by the housewife, who then heats the soup in a double boiler for approximately 15 min.

Small size of the can, through compactness of the product, makes it a desirable item because of its space saving qualities. Yet the consumer is able to obtain approximately a pint of soup.

The label is colorfully designed in red, white and blue, with an illustration of a lobster holding top hat and cane. Directions and list of contents are placed in two panels on a yellow background.

Labels are by H. S. Crocker Co. and cans by American Can Co., both of New York City.

For Package Data Use Reader Service

Package & Product Shorts

Grease-Resistant Parchment

A new type vegetable parchment paper that is both light in weight and extremely grease resistant has been developed by Patterson Parchment Paper Co., Bristol, Pa. Because of its high grease resistance it is recommended as a carton liner for lard or shortening. Further applications include its use as a printed insert in packages of coffee, nuts, and other oil bearing products. Also, it has been approved as an inner liner for cloth sausage bags.

For Package Data Use Reader Service

Rise of Yogurt

—*Continued from page 60*

the unwarranted claims, and the fact that the product in the form of milk is rather unpalatable, tended to kill its popularity.

At present, doctors sometimes prescribe acidolphilus milk for those suffering from special intestinal ailments, and accordingly several dairy companies and commercial laboratories continue to produce it in limited quantities.

Acidolphilus milk has been prepared by a number of methods. A mixture of strains of the organism *L. acidolphilus* is grown sufficiently long in milk to produce light curdling in 24 hr. Sweet whole milk is sterilized under pressure, cooled to 98.6 deg. F., inoculated with the organism, then incubated at the inoculating temperature for 12 to 24 hr. Following coagulation, the milk is stored in a refrigerator.

For those who dislike the flavor of acidolphilus milk, an unfermented product is recommended. This consists of highly pasteurized sweet milk containing many *L. acidolphilus* cells in suspension. The organisms are grown in a sterilized medium, then the cells separated and added to the sweet milk. Successful implantation of *L. acidolphilus* in the intestinal tract of rat and man has been accomplished with this product.

End (Resume reading on page 61)

New Guava Products

—*Continued from page 141*

and packed in cellophane and a cardboard container. The seasoning is made up of salt, paprika, garlic powder, peanut oil, and monosodium glutamate.

Another development is the frozen broccoli operation of Longmont Farms of Miami, turning out 20,000 to 30,000 lb. of the product daily in household carton packages. The continuous equipment employed, using a minimum of hand labor, was designed and built by university technicians under the direction of C. G. John, of the laboratories staff.

In addition to being used for research, the laboratories and pilot plants of the university are being employed for first-hand laboratory teaching of food technology, in which the U. of M. is now offering a four-year course. Emphasis is given in the curriculum to tropical and sub-tropical agricultural products.

End (Resume reading on page 142)

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FREE FLOWING SOLIDS

TABLETS

LIQUIDS OR SEMI-LIQUIDS

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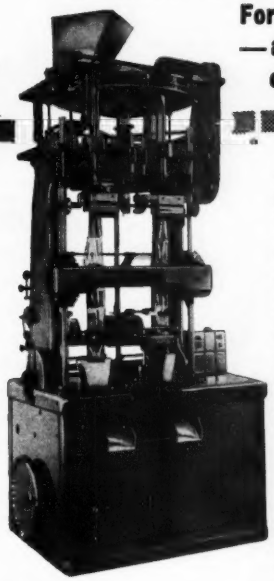

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MANPOWER Transwraps are fully automatic. One unit exceeds the output of 15 to 18 hand workers; and 2 operators can handle 10 Transwraps. This means you can increase your production per man-hour as much as 90 times!

TIME One Transwrap can automatically *form, fill, seal and deliver* 216,000 packages in an around-the-clock, 24-hr performance! This high-speed dependability is why more Transwraps were used in WW2 govt packaging—and are again, in today's emergency.

MATERIAL Save on both bag and product wastage. Transwraps use economical roll materials; eliminate wasteful puckering, distortion and gumming of bags; insure extra-fine precision measuring; minimize expensive breakage of fragile products.

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Transwrap's engineering staff will be glad to assist you in analyzing your packaging requirements . . . make specific recommendations designed to improve your production—at lower costs.

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Remember, too—Transwrap actually gives you a *better* package . . . smarter-looking, faster-selling. A package that *seals in* the fresh flavor and quality of your product—and *seals out* damaging air, vapors and moisture. You can't afford *not* to investigate Transwrap for your packaging economy. Do it today—*now!*

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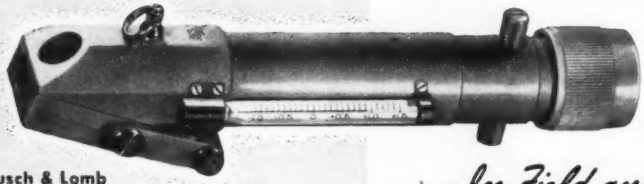
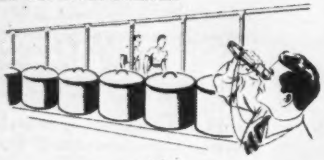


Bausch & Lomb
JUICE REFRACTOMETER



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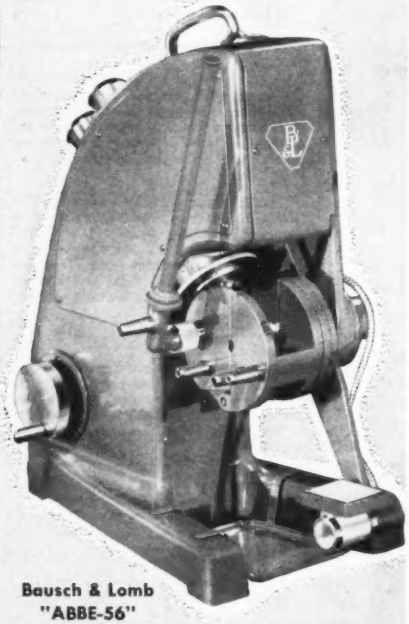

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Bausch & Lomb REFRACTOMETERS

ADVANCES IN TECHNOLOGY

Effective Sorting, Trimming, Control of Stock Will Assure Rot-Free Tomato Products

The two principal sources of contamination of tomato products are: (1) Decomposed tomato material from improperly sorted and trimmed tomatoes and from slime accumulations on dirty equipment, and (2) fly eggs and maggots from fly-infested raw stock or from a fly-infested factory. The F&DA uses the Howard mold count for judging finished tomato products with respect to the presence of decomposed tomato material, but it relies also on factory inspection as a means of enforcing its regulations. Inspectors not only examine sorted and trimmed stock to judge the elimination of rotten material, but they also examine equipment thoroughly and take scrapings of slimy accumulations.

The sorting and trimming process is the key to good plant operation. Either the single-belt or divided-belt sorting table will give satisfaction if properly used. The divided-belt system requires more handling, but it is more effective when a large proportion of the raw stock requires trimming. The single-belt system will give trouble when the raw material is being used for the preparation of canned tomatoes, with the residual stock being used for comminuted products. In such a case sorting and trimming should be done before scalding, because scalding obscures rot.

As in the control of rot, good factory operation is the best safeguard against fly infestation. The raw stock, rather than the finished product, should be tested, and the premises should be examined for refuse and spillings that might serve as breeding grounds for flies. In short, clean premises and effective sorting and trimming are the essential ingredients of a program to control rot in tomato products.

Digest from "Observations and Suggestions on Factory Control of Rot and Extraneous Matter in Tomato Products," by W. V. Eisenberg, presented at the Canning Problems Conference of the NCA., Atlantic City, N. J., Jan. 19, 1952.

Dirty Can-Handling Equipment Source of Recontamination

Contamination of filled-can handling equipment following water cooling can cause spoilage of contents, even though no defects in the cans were apparent through which leakage might occur.

When cans are handled at high speed, small deformations of the seams may occur which cause momentary leakage, and spoilage organisms may be drawn into the can at that time. Control of this spoilage is effected by drying the cans as rapidly as possible after cooling, by eliminating possible contact of porous materials with the cans, and by regular sanitization of the conveying and handling equipment.

Inspection of 25 tomato juice plants throughout the country has revealed common points of possible infection. All types of equipment following the cooler were found to be contaminated. Conveyors taking the cans from the cooling tanks were severely contaminated, even though few organisms could be found in the cooling water. Porous materials coming in contact with the cans were found to be serious sources of infection. Frayed belt retarders and felt moisture absorbing pads on steam hot-plate dryers were particularly bad sources of contamination. Belt conveyors and steel runways and chutes give high counts of organisms unless special care is taken to keep them clean. Consequently it is highly desirable to give attention to sanitizing all equipment following can-cooling in order to hold contamination to a minimum.

Digest from "Influence of Post-Cooling Operations on Spoilage by Recontamination," by O. G. Braun and W. L. Fletcher, presented at the Canning Problems Conference of the National Canners Assn., Atlantic City, N. J., Jan. 19, 1952.

DAIRY

Improved Phosphatase Test Features High Sensitivity

A simple test for detecting underpasteurized dairy products, utilizing only one buffer substrate and precipitant concentration, has been developed at Cornell University.

The test is highly sensitive, simple to perform, low in cost, and gives accurate results on samples of all dairy products regardless of their history or age.

In this test, the dairy product is incubated in a highly-concentrated Na_2CO_3-$NaHCO_3$ buffer substrate at pH 9.5-9.7, followed by precipitation with trichloroacetic-HCl solution. Filtrate is then made alkaline with Na_2CO_3 and color development proceeds using 2,6-dibromoquinonechloroimine solution (BQC). Overnight incubation is standard, but a short (1-hr.) and a rapid (10-min.) variation are available. Results point to the importance of using overnight incubation for greater sensitivity and accuracy.

Digest from "The Effectiveness of the Cornell Phosphatase Test For Dairy Products," by F. V. Kosikowsky, *Journal of Dairy Science*, 1151-58, Dec. 1951.

Product Scorching Avoided In Improved Spray Dryer

Reduction of sprayed material to a dry, free-flowing powder while still in suspension in the drying medium is the objective of a patented spray dryer.

Claimed for the unit is freedom from scorched particles, and from accumulation of tacky material on the walls of the drying chamber. The latter may be of the customary centrifugal or cyclone type. Invention lies in auxiliary apparatus for introducing 2 streams of heated air which not only cause flash evaporation of the sprayed ma-

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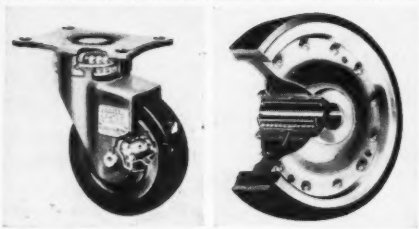
DARNELL

CASTERS & WHEELS



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terial, milk for example, but also keep the particles in suspension and away from the walls of the drying chamber until they are removed and collected in a conical separator.

In operation, filtered and heated air is drawn into the top of the drying chamber and divided into two streams. The main stream enters centrally through baffles that give it a swirling clockwise motion. As it mixes with the spray, it loses temperature and velocity. The secondary stream, also passing through baffles, enters the chamber through an annular opening. Here it encounters the main stream and augments its diminishing temperature and velocity. Combined action of the two streams causes intense agitation in the spraying zone. The principal motion, however, is rotary, so that the sprayed particles are kept in suspension and away from the walls of the chamber as they pass downward and out to a separator.

Digest from U. S. Patent 2,562,473, issued July 31, 1951, on an application dated May 7, 1945, to J. J. Mojonnier, Winfield, Ill., assigned to Mojonnier Bros. Co., Chicago, Ill.

CEREAL PRODUCTS

Fluffing Pie Crust Mixture

Troublesome problems in packaging pie crust mixture may be overcome by a patented process of fluffing the ingredients during the mixing process, and discharging the mixture directly into a package while in a fluffed condition.

Suitable equipment for the operation comprises a mixing bowl and beater or agitator driven by an electric motor. Transmission unit is of the type that imparts rotary movement to the beater about its own axis while moving it around the periphery of the mixing bowl. Latter has an opening in the bottom through which the mixture can be discharged directly into a paper container subsequently packed in a carton. Process keeps the mixture in motion and in a fluffed condition until it comes to rest in the container, and avoids hardening of the ingredients.

Digest from U. S. Patent 2,573,872, issued Nov. 6, 1951, on an application dated June 2, 1947, to William A. Reed, Larchmont, N. Y.

Function of Maturing Agents In Milled Wheat Flours

Modern production of bread for large populations makes mature flour, that behaves uniformly in baking machinery, an operating necessity if bread is to be made economically. And space for storage of flour during the months required for natural aging is not available. Even if it were, the cost,

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AND YOU'LL NOTE, I DON'T EVEN USE A SCRUBBING BRUSH···
AND TO THINK I'VE BEEN WEARING MY MOPS DOWN TO THE HANDLE··· WHEN I COULD HAVE BEEN USING LUSTRECLEAN THAT REQUIRES NO RINSING. AND LISTEN TO THIS··· IT'S GOOD FOR WOODWORK TOO···
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LUSTRECLEAN really cleans! Its emulsifying action loosens the most persistent dirt, grime . . . hard-to-remove rubber burns. No need to use harsh soaps or injurious chemicals. Proof? Ask for a sample and test it on the spots and blemishes your present cleaner won't remove!

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about 20¢ per month per 100 b., would be 30 to 40 times the cost of using maturing and bleaching agents, to say nothing of losses that would result from insect infestation and uneven aging.

The two functions of the oxides of nitrogen, chlorine, nitrosyl chloride, chlorine dioxide, and benzoyl peroxide, the agents permitted in the United States, are to make the flour whiter, and to produce, in a short time, the maturation that takes 4-5 months without treatment.

Well matured flours produce non-sticky bread doughs of good extensibility that expand on baking into properly-sized loaves of soft texture, thin cell walls, and fine, uniformly, grained crumb.

In contrast, green, unmatured flour yields undersized squatty loaves, of rough texture, large thick cell walls, and coarse non-uniform grain. Cakes and cookies are tenderer and of finer texture with smaller and uniform grain when made with bleached, matured flour. None of the authorized bleaching and maturing agents have toxic effects and there is very little evidence that they decrease vitamins or other nutritional factors.

Digest from "Maturing and Bleaching Agents Used in Producing Flour" by C. G. Harrel, *Industrial and Engineering Chemistry*, 95-100, Jan. 1952.

MEATS

Helical Sausage Casing Formed And Stuffed Simultaneously

Method and apparatus for continuously forming and stuffing a helical sausage casing, and intermittently forming links of the stuffed casing, are revealed in recent patent specifications.

The apparatus features a container from which sausage can be extruded through a hollow cylindrical mandrel that serves as a stuffing horn. A tubular sleeve surrounds the mandrel and rotates upon it. The helical casing is formed by a strip of sealable plastic material coiled about the sleeve by means of an endless winding belt. Adjacent edges of the strip overlap to form a joint that is sealed, preferably with a liquid that is a solvent for the strip material. Pressure is applied to the joint while the material is still tacky.

Linking of stuffed casing is done by a rotating wheel, the arms of which form V-slots into which the sausage is pressed. As the casing is still rotating, a twisted link is formed at the notch. Any plastic material that can be effectively sealed can be used for the casing. It may be preprinted, and

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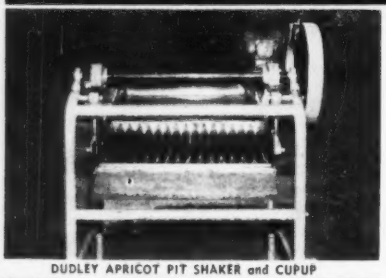
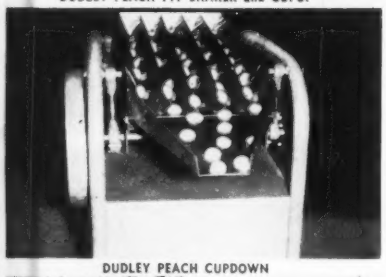
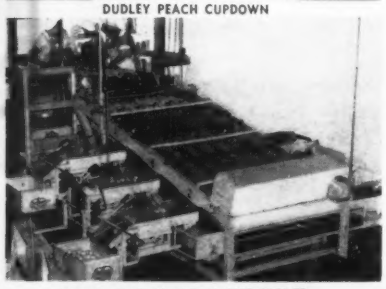


DUDLEY APRICOT PIT SHAKER and CUPUP

DUDLEY PEACH PIT SHAKER and CUPUP



DUDLEY PEACH CUPDOWN



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- **Peach Pit Shaker and Cupup**
- **Peach Cupdown**

THE high speed, fully automatic operation of these Dudley machines steps-up the speed of packing lines. These high speed, fully automatic Dudley machines eliminate hand turning, step up packing line speed. Whether turning the halved fruit to a cupped-up position for inspection, or to a cupped-down position for inspection and slicer-feeding, the *positive turning action* of the stainless steel channels assures absolute accuracy. *On average installations, each of these units will replace four manual operators.*

Diverging-Roll Size-Grader

Fast, gentle and accurate size-grading of fruits, vegetables, pickles and other products is now possible with the fully automatic Dudley Size-Grader. Unit fits smoothly into the existing arrangement of any processing line; handles a wide variety of products. Capacity of Grader varies with size of product being graded.

Basic simplicity and sturdy construction of every Dudley machine assures continuous, dependable service. Other Dudley machines: the Dudley Can Unscrambling System, Empty Can Unscrambler, and Flat Can Unscrambler; the Dudley Bag Filler and the Dudley Can Husker.

For full information on Dudley machinery, write for Bulletin 102

DUDLEY *Machinery Corporation*

Mountain View, California

the printing may be done on the inside with a fat-soluble food dye that will transfer to the surface of the sausage, so that the meat will bear the printing after the casing is removed.

Digest from U. S. Patent 2,575,467, issued Nov. 20, 1951, on an application dated Nov. 20, 1951, to F. H. Reichel and C. L. Harder, Fredericksburg, Va., and assigned by mesne assignments to American Viscose Corp., Wilmington, Del.

Effect of High Salting On Quality of Bacon

Keeping quality of Canadian Wiltshire bacon is not appreciably improved by addition of salt in excess of 3.5 to 4 percent in the lean meat.

Carefully controlled experiments on a large number of fresh rib-in export backs (104 backs to each experiment), have shown that, with 3-4 percent of salt, the bacon will keep in good condition for 3-4 months at 23 F. Increasing the salt up to 6 percent had little effect on quality maintenance, and not enough to justify the reduction in consumer preference that results.

At storage temperatures higher than 23 F., sliming precedes tainting. In about 30 days at 27 F. the surface bacterial count was so high that extensive washing and trimming would have been necessary to make the bacon marketable, though the flavor score was not adverse until about 90 days of storage. At 30 deg. each added 1 percent of salt increased storage life 3-4 days on the average.

Digest from "Canadian Wiltshire Bacon. XXXI. Effects of Salt Content and Storage Temperature on Storage Life", by N. E. Gibbons, D. Rose, and J. W. Hopkins, *Canadian Journal of Technology*, 458-68, Nov. 1951.

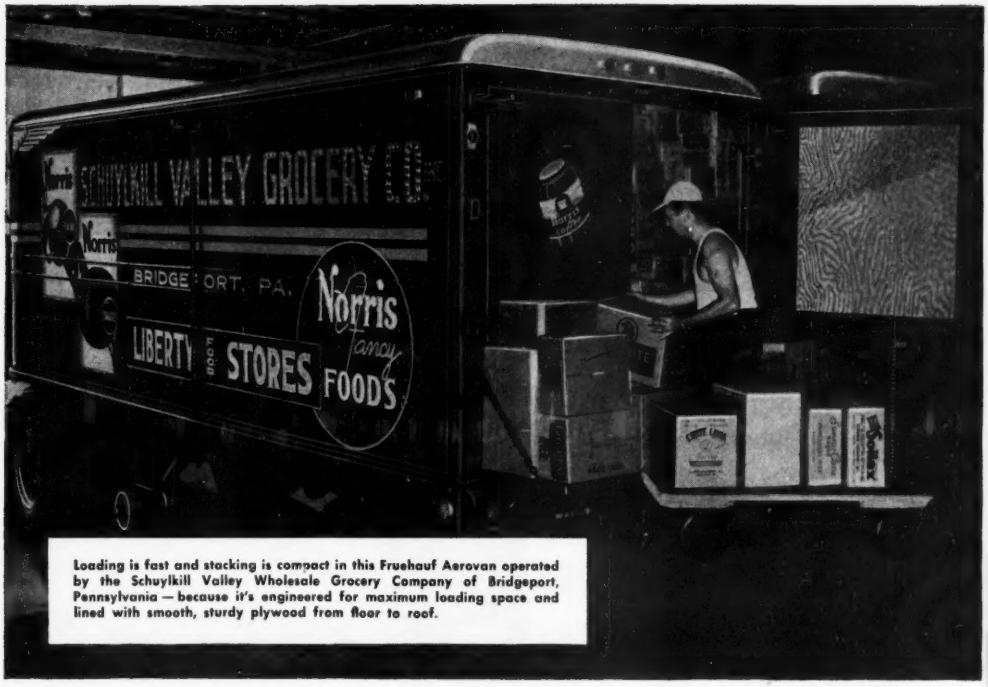
SANITATION

Cannery Waste Disposal

Application of spray irrigation to disposal of cannery waste waters, inaugurated in 1947, has now been adopted by approximately 25 canneries in 7 states.

In this system, a high-pressure sprinkler system is used to apply the maximum amount of waste water to land consistent with minimum damage to crops and without runoff.

Equipment comprises light weight aluminum or galvanized piping equipped with special couplings to permit rapid laying and moving over the area to be irrigated, an electric or gasoline pump, and self-actuated revolving sprinklers. Applications vary from 2½-8 in. of waste per day depending on soil conditions. Nozzle pressures of 35-100 lb. are used, and each sprinkler usually irrigates one acre.



Loading is fast and stacking is compact in this Fruehauf Aerovan operated by the Schuylkill Valley Wholesale Grocery Company of Bridgeport, Pennsylvania — because it's engineered for maximum loading space and lined with smooth, sturdy plywood from floor to roof.

Fruehaufs Load Faster, Arrive Faster

...and Food Products are Fully Protected!

LIKE THOUSANDS of food distributors, processors, and retailers, Schuylkill Valley has found that the fastest, cheapest, *surest* way to haul food products is by Fruehauf. Easily damageable or perishable foods receive extra protection in Fruehauf units, and the smoother riding qualities of Fruehauf's patented suspension systems is an added safety factor. The extra-tough, steel-ribbed hardwood floor is specially treated to withstand the severest use — to give the longest, smoothest service. This high quality construction, and the low cost of operation and maintenance, add up to greater, more certain profits for Fruehauf operators everywhere.

IMMEDIATE FACTORY BRANCH SERVICE WHEREVER YOUR FRUEHAUF GOES!

YES... there's a Fruehauf *built right* for hauling every food product! You can't fail to profit by investigating the use of Fruehaufs in *your* business. For Fruehauf's free "Transportation Cost Analysis" see your nearest Fruehauf Branch.

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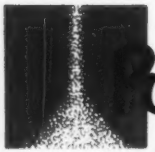
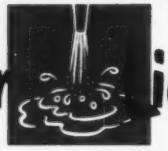
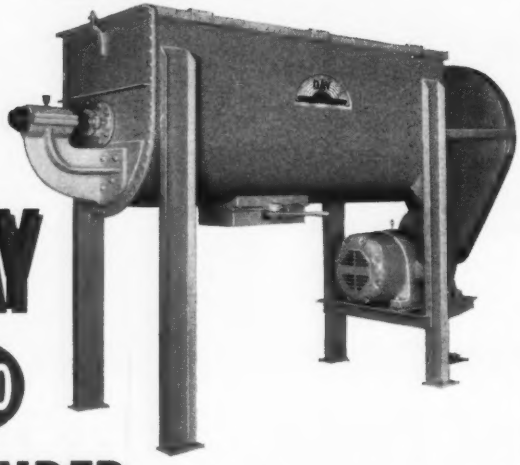
FRUEHAUF Trailers
"ENGINEERED TRANSPORTATION"

WORLD'S WIDEST VARIETY OF TRAILERS

 For more information, use post card on last page.


Powders

Pastes
or

Liquids



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Whether you work with powders, pastes or liquids, you can depend on a DAY D-10 BLENDER to boost production. Scientifically designed agitators insure constant, thorough blending action. Sturdy outboard bearings provide ample support for the agitator shaft, remain free from abrasive action by the material being mixed and also eliminate bearing loads on the stuffing boxes. Heavy-duty design includes a rigid frame that is free from vibration, plain or stainless steel tank and a geared head motor with roller chain drive. Discharge at center or either end is optional. Available with Spiral Ribbon Agitator for paste, semi-paste, granular or liquid products.

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Optional, supplied when necessary for materials such as heavy-bodied powders.

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DAY

THE J. H. DAY COMPANY, CINCINNATI 22, OHIO
INCORPORATED

In application of this system the following factors must be considered: (1) Availability of land within economical pumping distance; (2) soil absorption characteristics; (3) possibility of well pollution, (4) type of ground cover. It has been observed that a good grass mixture or alfalfa more than doubles the absorption capacity of a soil.

Digest from "Spray Irrigation As a Means of Cannery Waste Disposal," paper presented by N. H. Sanborn, NCA, at Canning Problems Conference of the NCA, Atlantic City, Jan. 20, 1952.

BOD of Dairy Plant Wastes Cut 95 Percent In 6 Hr.

A process for treatment of dairy wastes that quickly removes all the lactose and a majority of the protein has been developed in the laboratories of ERRL, Philadelphia 18, Pa.

In the process, waste discharges from the dairy plant to a tank where it is diluted with an equal volume of water, mixed with about 20 percent inoculum, and areated continuously and vigorously for 6 hr. Original inoculum may be obtained from an activated-sludge plant, preferably one operating primarily on dairy wastes. Once established, inoculum can be held from previous days' waste.

Effluent from tank is then centrifuged to remove cells, which may be dried for fertilizer. Discharge from centrifuge may then go into a stream, or municipal disposal plant.

Due to the extremely fast rate of assimilation of the wastes by the microorganisms, oxygen demand is very high. If aerobic conditions are maintained, however, byproducts of oxidation are negligible, and acids do not accumulate.

Digest from "Assimilation of Dairy Wastes by Activated Sludge," by S. R. Hoover and N. Porges. Paper presented at Symposium on Pollution and Industrial Wastes, Philadelphia, Dec. 27, 1951.

FRUITS AND VEGETABLES

Mold Counts Are Indicative Of Raw Tomato Quality

In a study of the relationship of visible rot to mold count in tomato products, three separate investigations reported in 1917, 1940, and 1945 gave remarkably consistent results. Low visible rot gave low mold counts, but larger amounts of visible rot gave highly variable mold counts. In the latter case even average results over a long period of time showed zones of possible rather than a linear relationship.

In the earliest report it was stated

Let's take a **CLOSER LOOK** at

STAINLESS TUBING FABRICATION

If you make or maintain food processing equipment, chances are you encounter one or more problems of workability in welded or seamless stainless steel tubing. The random group of tubular parts above represents a wide range of fabricating problems successfully met by a variety of B&W Stainless analyses ... carefully selected, not only for chemical and mechanical properties, but also for the *mill condition* best suited to the fabricating requirements of each product. Remember, tubing is more than bar stock with a hole in it. It's a semi-finished product. Be sure that your tube mill is doing as much of your work as is practicable *before delivery* by pre-conditioning your stainless tubing for fastest, most economical fabrication. You can be sure by consulting Mr. Tubes—your B&W Tube Company Representative. Write for Bulletin TB-1.

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TUBULAR PRODUCTS DIVISION

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B&W SEAMLESS and WELDED TUBES

(TA-16425)

LOW COST
HIGH EFFICIENCY
REFRIGERATION
is something
BRUNNER can prove!

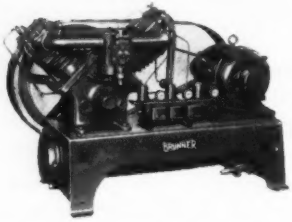
Processing, storage, transportation, retailing, wherever refrigeration is used in the food industry, Brunner units are at work—economically, efficiently and dependably doing the jobs assigned them.

Starting with the A-18 air cooled, ¼ horsepower compressor to the W-75000, eight cylinder 75 ton capacity condensing unit, Brunner makes available 69 open type models—each of them offering one or more specific refrigeration or air conditioning application advantages.

BRUNNER
SINCE 1906

The Brunner Catalog fully describes these units. We invite your request for a copy.

REFRIGERATION



MODEL W-10000 four cylinder Water Cooled Condensing Unit. Equipped with Brunner automatic capacity control, 4 steps of capacity are possible. Accurate control of desired temperature is held with less frequent cycling. lower power consumption.

Get acquainted now with the refrigeration and air conditioning planning, installation and service facilities offered by your local Brunner representative. His abilities are further supported by a factory application-engineering staff, and experience files gathered from every segment of the food industries. Low cost, high efficiency refrigeration is something Brunner can prove. Write us.

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BRUNNER

AIR CONDITIONING Self Contained Units to 10 hp. Condensing Units for Remote Installation to 75 hp.

AIR COMPRESSORS Single Stage ¼ hp. to 2 hp. Two stage 1½ hp. to 15 hp. Horizontal and Vertical Models.

that "The percentage of decay in the sorted stock should be one percent or less". Agreement was expressed in the second report. Later, announcement was made of the first official mold count tolerance for tomato products. Since 1916 this tolerance has been reduced until in 1938 it was 25 percent for tomato juice and 50 percent for other comminuted products. In 1940 it was proposed to reduce the tolerance on tomato juice from 25 to 15 percent. This met with a united protest from industry, and after investigation the tolerance was raised to 20 percent on tomato juice, and was kept at 40 percent for other comminuted products. Nevertheless, high mold counts are still regarded as indicative of unsatisfactory raw material with respect to the presence of filth.

Validity of the Howard mold count has been sustained over the years. Recently eight analysts representing three organizations checked mold counts without showing significant difference in their results. It is regarded as a satisfactory analytical method in the hands of properly trained laboratory technicians.

Digest from "The Relation of Visible Rot to Mold Counts," by Howard R. Smith, presented at the Canning Problems Conference of the National Canners Assn., Atlantic City, N. J. Jan. 19, 1952.

Lemon Prepackaging Tests Show Value of Wrappings

A wide variety of films can be used in prepackaging lemons, particularly if the fruit is for prompt retail distribution. But where storage is extended to 3-4 weeks, certain films seem to have superior moisture-retaining properties, thus preventing shriveling of the fruit.

In a series of 5 tests conducted during 1947, '48, and '51, the first two indicated that either perforated or non-perforated moisture-proof-cellophane (MSAT) held lemons in good fresh salable condition for 1-2 weeks at 70 F. and 3-4 weeks at 50. Semi-moisture-proof cellophane (LSAT), cellulose acetate (CA), and kraft paper bags with cellophane windows provided practically no protection against weight loss at 70 F., but at 50, lemons in CA and kraft bags had shelf lives of 1 week, and those in LSAT 1-2 weeks.

In the third test, lemons overwrapped with perforated or non-perforated Pliofilm, or MSAT remained in good salable condition for 2 weeks at 70 F. Fruit overwrapped with non-perforated LSAT, CA, and unwrapped had shelf lives of 1 week at 70 F. At 42 and 50 F., unwrapped lemons had shelf lives of 2 weeks,

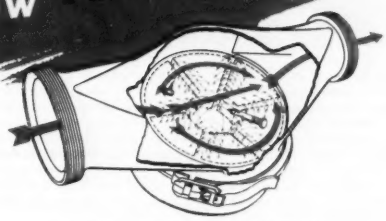
Here's POSITIVE protection against contamination!

TRI-CLOVER'S new all-sanitary MAGNETIC FULL FLOW TRAP!

HERE is the perfect answer to tramp iron problems. Gone is the hazard of stray metal in your liquid conveying lines spoiling your product or damaging your machinery. With this new Tri-Clover *all-sanitary* full-flow Magnetic Trap, protection is positively assured. Advance design in stainless steel permits easy removal of all trapped foreign matter through instant disassembly of the trap.

Fabricated from wrought stainless steel, in 2″, 3″ and 4″ O.D. sizes, the Tri-Clover Magnetic Trap is available with Acme Sanitary Threads; Van Stone ends; or with I.P.S. screwed ends. With these 3 fitting types, the Tri-Clover full-flow Magnetic Trap is completely adaptable to a wide variety of existing piping arrangements.

Over 30 years of specialized experience in supplying the food, dairy and chemical industries with corrosion-resistant fittings, valves, pumps and tubing has been utilized in this newest development of Tri-Clover. For further details, write for your copy of CATALOG SHEET 1151.



Designed for *POSITIVE ACTION*

The arrows above illustrate how fluid, upon reaching the Tri-Clover Magnetic Trap, flows in a widening stream over the magnetic field. Tramp iron is trapped in a recessed area over the extra-wide magnet area, and is easily removed by simply releasing ring clamp. No need to remove entire magnetic trap from the line.

Outstanding FEATURES:

Fabricated from type 316 Austenitic stainless steel • Highly polished ID and OD stainless steel surfaces • Streamlined construction, tapered surfaces for minimum agitation and friction • Wide magnetic contact area • Strongest magnet known—exerts pull over entire trap area • Manufactured from wrought material—NO pin holes, cracks or other defects • Lightweight—fast, easy assembly (50% less than cast type) • Instant disassembly • Available in 3 fitting types—in 2″, 3″ and 4″ sizes.

READY FOR CLEANING IN JUST 2 SECONDS

. . . It's just this simple. Unsnap ring clamp. Clamp, magnet and gasket are freed and ready to clean. That's all there is to it!

T-152

Tri-Clover® MACHINE CO.
Kenosha, Wisconsin

SUBALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES

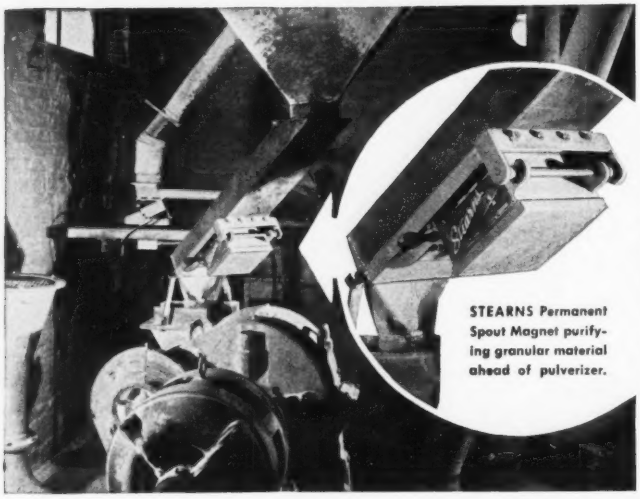
THE Complete LINE

FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

Stearns PURIFIES PRODUCT! PROTECTS MACHINERY!

Permanent Spout Magnet

The only permanent spout magnet that cleans itself automatically!*



STEARNS Permanent Spout Magnet purifying granular material ahead of pulverizer.

ELIMINATE all tramp iron from your product the low cost, dependable way — install a STEARNS Permanent Magnet with Automatic Tramp Iron Discharge.* No more time lost in hand cleaning; just push the handle and the tramp iron drops right off the magnet.

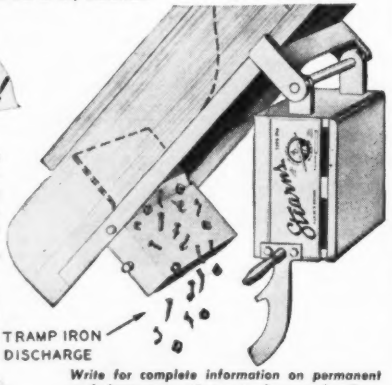
Best of all, STEARNS Permanent Spout Magnets save you thousands of dollars by protecting expensive machinery and keeping your product pure — and yet cost nothing to operate! That's exactly the story of the installation pictured above; the sugar is kept pure and the pulverizer is protected without any operating or maintenance expense.

Keep your production costs down with STEARNS Permanent Spout Magnets — no more tramp iron means fewer repair bills on processing equipment, fewer shutdowns and higher production.

Simple to install, STEARNS Permanent Magnets may be used in metal or wood spouts or chutes. They work equally well with wet or dry materials.

costs less than you think!

Picking tramp iron off a magnet by hand is a tedious, time consuming job. Save time and money by installing a STEARNS Permanent Magnet with Automatic Tramp Iron Discharge.*



* Patent No. 2461008

Write for complete information on permanent and electro magnetic spouts, drums and pulleys.

Foremost in the Magnetic Field

Stearns MAGNETIC INC.

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those wrapped with CA 2-3 weeks, and those with other films 4 weeks.

The final 2 tests showed that lemons were little affected by 4 weeks enclosure in perforated and non-perforated MSAT or Pliofilm bags when stored at 38 or 55 F.

Digest from "Market Prepackaging Tests with Lemons," by H. W. Hruschka and J. Kaufman, H. T. & S. Office Report No. 261, USDA, Agr. Research Administration, Washington, D. C.

MISCELLANEOUS

Chemical Weed Control Needs More Research

Experimental use of weed control chemicals shows that they are available for only a very few crops. And a lot of work has to be done before truly selective materials are found that can be applied before the crop plants emerge. Research is advancing rapidly in this field, but recommendations should not be made until the agency finds the limitations of a material or an application method.

In the experimental work from which the foregoing conclusions were drawn, 10 vegetables were treated with one or more of 12 chemicals supposed to be useful in weed control. Those which showed promise will be investigated further. In some cases the material was effective but too expensive for large-scale use. In others, no satisfactory materials were found. In general it was found that materials must be discovered which are selective with respect to the crop. It was also determined, without discovering the reason, that there is some benefit to the crop from cultivation other than weed control.

Digest from "Chemical Weed Control in Canning Crops—Northeastern States," by W. C. Jacob, presented at the Raw Products Conference of the National Canners Assn., Atlantic City, N. J., Jan. 20, 1952.

Proposed Labeling Of Dietetic Foods

Considering the importance and growing use of canned dietetic foods, there has been little standardization of labeling information to guide the consumer in selection of the product. In fact, labeling has been largely a matter of individual decision by the canner. Lack of uniformity has led to discussions between NCA and the F&DA, resulting in proposed definitions and standards, summarized as follows:

A "dietetic canned food" is held to be definitely represented as one for special dietary use, and therefore subject to labeling requirements pertaining to these foods. The label should

STOP
FOOD SPOILAGE!

We all like to eat, but how many of us appreciate the important part chemistry plays in keeping our foods flavorsome and safe from spoilage? It takes extensive research and testing programs by food manufacturers to achieve these ends. Products developed by the chemical industry have helped in many ways to speed this progress.

Heyden is proud of the contributions made by its fine chemicals especially adapted to food uses. Its Sodium Benzoate, for instance, has long been used to stop food spoilage and to preserve the flavor of many foods and beverages. Other products that have been developed and manufactured in highest purity by Heyden also enhance the keeping qualities and enjoyment of foods.

SODIUM BENZOATE

U.S.P. Powder and fast dissolving Flakes. Long established preservative for many foods and beverages. Shipped in 100, 50 and 25 lb. fiber drums.

BENZOIC ACID U.S.P. Powder and Crystals. Used as preservative in same way as sodium salt. Shipped in 100, 50 and 25 lb. fiber drums.

BENZALDEHYDE N.F. Grade. For flavor and aroma in foods, candies and beverages. Shipped in 425 lb. drums, 50 and 25 lb. tins.

METHYL SALICYLATE U.S.P.—Synthetic oil of wintergreen. For flavoring confectionery and beverages. Shipped in 500 lb. drums and 50 lb. tins.

PROPYL GALLATE—A highly effective antioxidant for retarding rancidity of lard and other edible fats and oils. Shipped in 200, 100, 50 and 25 lb. fiber drums.

SACCHARIN and SACCHARIN SODIUM Sweetening agents in special foods for restricted diets. Shipped in 100 and 25 lb. fiber drums.

* * *

Samples sent promptly on request.

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Serving Industry through Finer Chemicals

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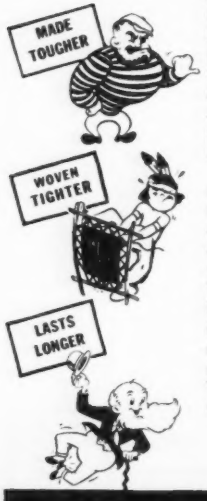
Resorcinol • Salicylates • Salicylic Acid • Streptomycin

"I suppose we are a mite too fussy about our products but then we've grown from a 'one-horse' outfit to national prominence by giving BIG attention to LITTLE details. For instance, I was in one of our plants one day and noticed a stained and worn conveyor belt. They were running cup cakes right then and I picked one up and it was beautiful but . . . it *smelled* peculiar. When I found out how many food products we had run on that line, I went out *looking* and discovered PLASTEX."



PLASTEX is the Conveyor Belt that was designed especially for the food business and is Buffalo's regular Solid Woven Cotton Belt covered with a tough coat of PLASTIC. It won't crack or peel, is impervious to oils, greases, acids, alkalies, and moisture and withstands temperatures from -20 to 200°F. PLASTEX won't absorb or exude ANY ODORS and can be easily and quickly cleaned by ANY method . . . including steam. Fully pliable, it requires no special care and will last longer than *any ordinary untreated conveyor belt.* If you're FUSSY, too, investigate PLASTEX. Ask your jobber or write BUFFALO direct. (They're the ONLY company that makes it).

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bear a statement giving special properties of the product, such as "low calorie," "low sodium," or "low calorie and low sodium."

If the product is one in which added sugar or salt are customary ingredients, some such statement as "packed without added sugar," or "packed without added salt," would be acceptable. If water is the packing medium, "packed in water without added sugar" would be preferable.

The label should carry specific information on the amounts of dietary factors contained. It should show values for carbohydrate, protein, and fat in low-calorie diets, and of Na in low-sodium diets.

Label reference to the absence of added Na (or salt) should be accompanied by a statement of actual Na content, expressed preferably in mg. Na per 100g.

In offering to the public a food represented as having special dietary properties, the distributor must take the responsibility for making an appropriate study of his product as a basis for special label claims.

Digest from "Labeling of Dietetic Canned Foods," by E. J. Cameron, presented at the Canning Problems Conference of the National Canners Assn., Atlantic City, N. J., Jan. 19, 1952.

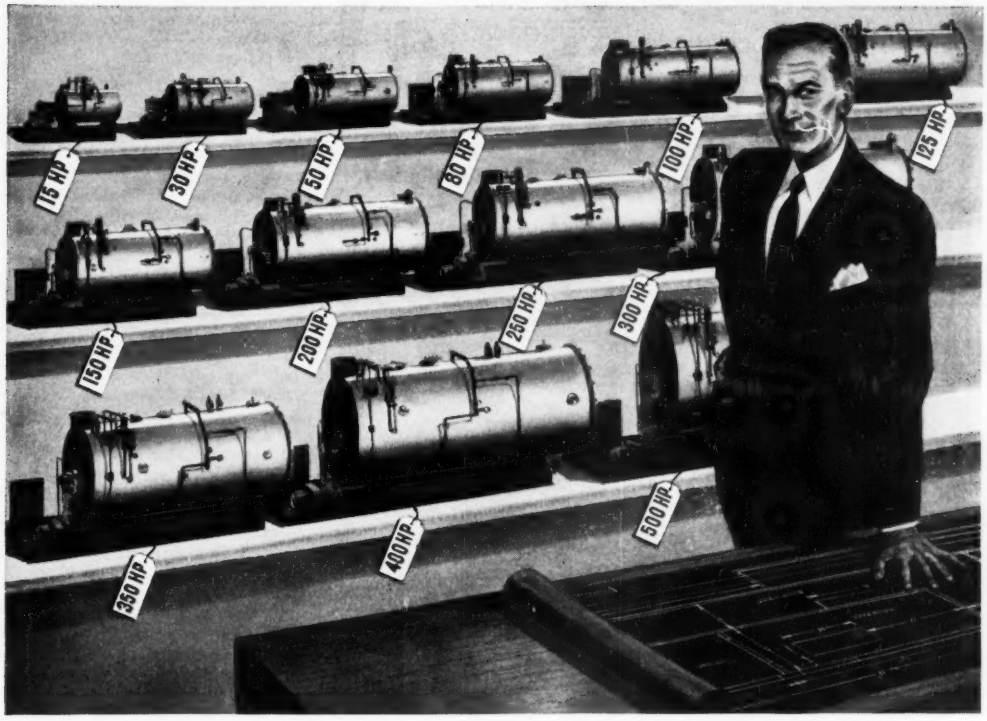
Wasteful Use of Water

The canning industry is a large consumer of water, not only for processing but also for disposing of liquid wastes. In a survey of the industry in California average use per 2½ equivalent case was found to be 190 gal. for spinach, 255 for asparagus, 65 for peaches, and 57 for fruit cocktail and salad. Range between plants packing the same product were found to be 5:1 for spinach, 6:1 for asparagus and peaches, and 4:1 for fruit salad. Evidently there was wasteful use in some canneries. Those faced with water shortage made the greatest efforts in conservation.

The survey showed the major uses of water in canneries to be: Can cooling, product washing, and plant cleanup. Some of the possible conservation practices appeared to be: Recirculation of can-cooling water over a tower; reuse of this cooling water for product washing, flushing, in dicer sprays, for belt lubrication, in boilers, and for plant cleanup; recirculating water in some types of product washers; reuse of water from product washers in prior washers; and reuse of wash water or screened waste water for flushing gutters.

Digest from "Survey of Water Use Practices in California," by E. S. Doyle, presented at the Canning Problems Conference of the National Canners Assn., Atlantic City, N. J., Jan. 20, 1952.

Selecting The Right Boiler Is Most Important...

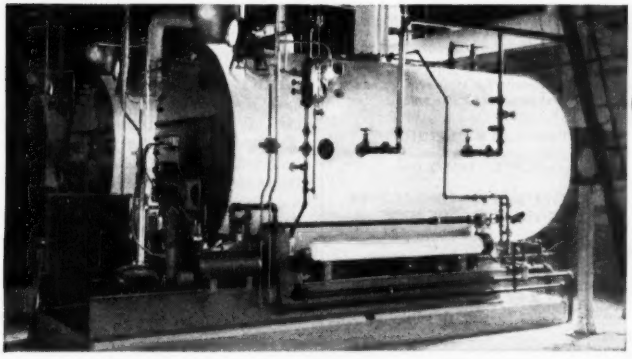


Cleaver-Brooks does not sell steam boilers "off the shelf" even though the boilers are available in standard models. Working with you, your engineers, and your consulting engineers Cleaver-Brooks helps analyze your particular steam needs and loads, both present and future.

These are a few of many factors considered: steam requirements in pounds per hour or b.h.p. — constant or fluctuating loads — fuels available — electric current characteristics — space and boiler room layout — provision for expansion.

Application engineering assistance of this kind assures you a steam plant tailored for your job. Cleaver-Brooks are the first and finest in modern, self-contained steam boilers — operate at a guaranteed efficiency of 80% — burn the fuel most available and economical in your area, gas, oil, or combination gas and oil — fully meet all codes — standard models available in sizes 15 to 500 hp; 15 to 200 p.s.i.

Write for latest, fully illustrated and descriptive Cleaver-Brooks Steam Boiler catalog.



Cleaver-Brooks
STEAM BOILERS

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LYNCH CORPORATION of Toledo, Ohio,
—a leading manufacturer of packaging machinery

MORPAC Model "T" and "K" combined print forming, wrapping and cartoning machine

The following quotation is taken from a letter we received from their Director of Sales:

"The majority of our machines are used in places where it is necessary to wash them with steam and hot water after each day's use. This naturally would remove any ordinary lubricant and trouble would develop if the machines were not immediately relubricated. With LUBRIPLATE it is different. There is always a film of LUBRIPLATE left on the machine after washing. This gives protection not only to moving parts, but also prevents general corrosion. The presence of salt and lactic acid in packing plants makes oxidation a hazard. LUBRIPLATE prevents this too.

"LUBRIPLATE greatly reduces unnecessary wear and prolongs the life of machines. It has reduced customer calls for service to a minimum. Our Service Engineers can readily spot machines that have had other than LUBRIPLATE Lubrication, as these machines do not give the service they should.

"After using LUBRIPLATE for over ten years, we are very well pleased with it and enthusiastically recommend it."

A LUBRICANT must be more than good to warrant such a recommendation. The Lynch Corporation, as well as hundreds of others who build machines to sell, not only use LUBRIPLATE Lubricants in their own shops, but also advise the buyers of the machines to always use LUBRIPLATE for re-lubrication.

LUBRIPLATE Lubricants are different from all other lubricants. They have properties all their own . . . they reduce friction and wear, prevent rust and corrosion and save power. They stay put under most adverse conditions and do not run out or wash away.

There is a LUBRIPLATE Lubricant that is just the right density for your requirements. Let us tell you about it. *Write today.*

LUBRIPLATE DIVISION
Fiske Brothers Refining Company
Newark 5, N. J. Toledo 5, Ohio

DEALERS EVERYWHERE—CONSULT YOUR CLASSIFIED TELEPHONE BOOK

LUBRIPLATE *THE MODERN LUBRICANT*

Pressure Sanitizing

—Continued from page 43

for siphoning such solutions into the unit and a needle valve for regulating its proportion from 0-10 percent of jet volume.

Detergent is mixed in 50-gal. steel drums at a central point in the Morrell plant, ready for pick up by cleanup men when needed.

Practically every location in the packing house is now in the range of a jet cleaner. And while most of the cleanup routine is scheduled after processing hours, the simplicity of handling this equipment allows a running daytime sanitation of such items as meat carts and racks, or aisles and passageways which may litter up.

Here is a spotcheck of departments where the jets are now employed: Pork and beef kill; pork trim; grading; smoked meat; sausage; canned meats; lard refinery; ham boning; and the tank room. Units in these locations are put into action at least once each day the departments operate.

Probably the most important use for the jet technic is in bacteria-responsive locations—killing, cutting, and boning. In these operations there have been really substantial reductions in counts due to the higher solution temperatures possible with this cleaning.

Another vital benefit is ability to clean inaccessible places without excessive movement or dismantling of equipment. In smokehouses, for example, the conveyor is simply set in motion and rails and hooks are cleaned as they pass the hanging door.

An additional virtue of the new system is that it permits simultaneous cleaning at many locations without decreased efficiency. Often when a straight hose-and-water cleanup is underway throughout a plant, water temperature and pressure may drop enough to impair effectiveness. Use of steam in the jet, however, is not liable to such variations—steam pressure will usually remain constant even at full cleaning load.

Efficiency Tips

After considerable experience, we have discovered three factors in the use of the jet cleaner which bear directly on the efficiency which can be achieved. First of all, for top performance the unit should be operated according to the directions given by its maker. This refers to recommended size of steam lines, hose lengths, and so forth.

Second, small rooms that are not well ventilated offer a problem. During jet cleaning, fogging of such areas cuts down the operator's visibility—

For 25 years U.S.P. Glycerine has helped put the eye-appeal and taste-appeal in Curtiss marshmallows. Each fluffy marshmallow is firm, never granular. There's no "weeping" or separation. Shelf life is longer. Glycerine adds freshness that you can see and feel! *With absolute safety*—proven by years of consumer acceptance.

U.S.P. Glycerine has literally hundreds of applications in food and confectionery processing. The whole story—neatly wrapped in a handy 16-page booklet—is yours for the asking.

GLYCERINE PRODUCERS' ASSOCIATION

295 Madison Avenue
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8

Please send a copy of "Why Glycerine for Foods?"

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Company _____

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City _____ Zone _____ State _____

With This NEW Improvement Niagara "No-Frost Method" puts you a big step ahead in trouble-free, automatic refrigeration or freezing

Niagara "No-Frost Method" keeps frost and ice COMPLETELY OUT of your cooling, chilling, freezing or cold storage.

It uses Niagara No-Frost Liquid Spray to keep frost and ice from ever forming. It gives you, automatically, refrigeration with no defrosting, and full capacity NEVER cut down by ice building up progressively on refrigeration coils.

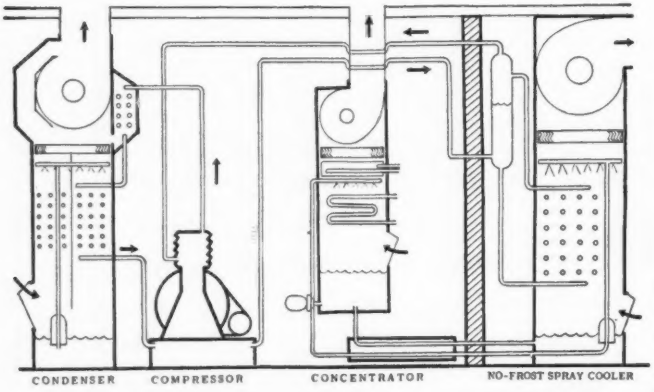
Now, a NEW design No-Frost Liquid concentrator, using a new principle, takes away moisture as fast as it is condensed by evaporating it at low temperature — not boiling it away at high temperature. It has 14 times the capacity of the old method per dollar of investment — one concentrator will handle a battery of high capacity spray coolers.

This gives you more refrigeration at lower cost; less machinery in less space. You operate at high suction pressure, saving power and wear and tear on compressors.

The extra capacity and lower cost both for equipment and operating makes this method advantageous for every type of refrigeration use — both for freezing and for moderate temperatures — for large "live" loads as in meat chilling or in fruit and vegetable pre-cooling — for rooms that are filled and emptied of product daily, such as milk rooms and terminal storage warehouses.

You get true trouble-free refrigeration . . . No brine . . . no salt solution . . . no dirt . . . no mess . . . It is entirely clean; you get rid of dirt and odors. You reduce both equipment and operating costs.

For complete information write to the Niagara Blower Company, Dept. FI 405 Lexington Avenue, New York 17, New York.



A simple method, easily maintained. Saves a third of your refrigeration cost. Ask for Niagara Bulletins 118 and 119.

limiting efficiency of his work and raising a safety problem.

A possible way to deal with fogging in small areas is to employ a system of forced-draft ventilation with controlled-temperature incoming air. If the heated air is brought in near the floor of the room this will lessen condensation and the steam will tend to rise. The exhaust fan, then, can be mounted near the ceiling for drawing the steam up and out. Net effect of this system, of course, would be to raise the visibility level above the operator's head while he is cleaning.

Third is the well-known human factor: As with any other manually operated equipment, final efficiency of the jet unit depends on the operator. The machine is only capable of delivering the many aforementioned advantages if it is handled correctly.

Perhaps this vital efficiency in operation of the units is best secured by assigning to an able foreman the prime supervisory responsibility for the jet equipment. The enthusiasm and applied "know-how" that such a man will engineer is sure to boost cleaning standards throughout the plant.

End (Resume reading on page 44)

"Bottle-Gassed" Trucks

—Continued from page 140

was not made automatic will be brought out below.

Each driver is assigned the task of recording his mileage reading when switching over from an empty tank. In this way, an accurate record of mileage per cylinder is kept. Such figures minimize the danger of running out of "gas" without a spare tank.

By emptying one cylinder at a time, instead of both simultaneously, the guesswork is also taken out of determining when replacements should be made. Now, refill cylinders are merely slipped in to replace the spent bottle as designated by the driver. Garagemen at Omar can affect this switch in a matter of a few minutes.

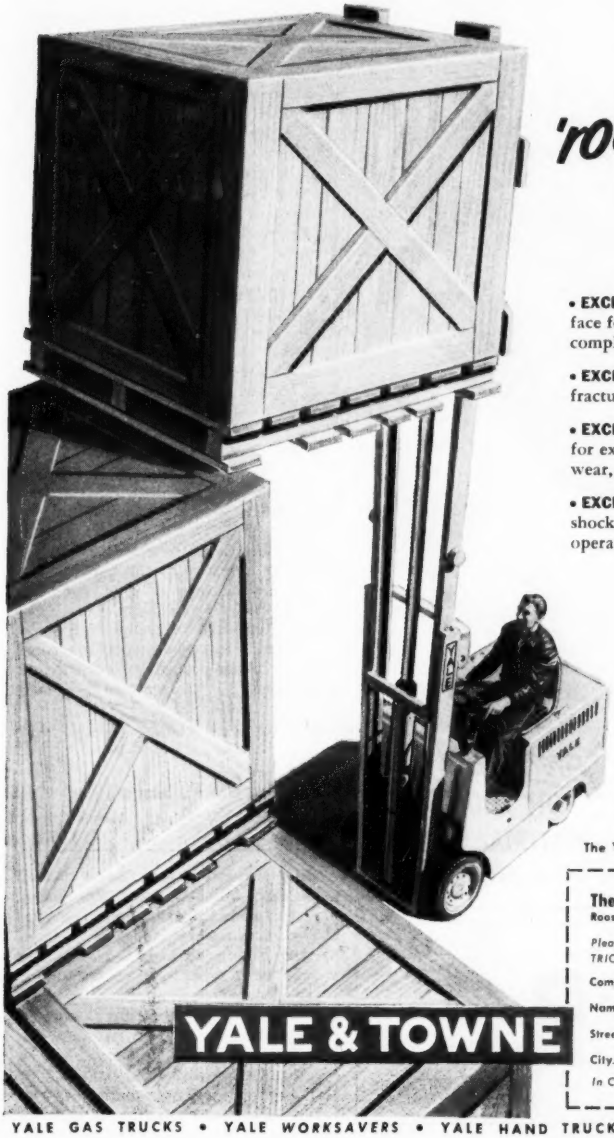
To date, mpc. (miles per cylinder) has varied from 75 to 200—depending upon the number of stops and starts. Each cylinder holds 79 lb. of LPG, or 17 gal.

Before use in the trucks' standard gasoline engines, LPG has to be filtered, reduced in pressure, and vaporized. After passing through the filter, which removes any entrained solid matter, the gas passes through a regulator. Here, tank pressure (100 to 200 psi.) is reduced to either 4, 12, or 15 psi.—according to the make of carburetor used.

Two low-pressure gas regulators are

More of industry's tough jobs go to YALE because...

EXCLUSIVE FEATURES EQUIP YALE ELECTRIC TRUCKS FOR



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YALE is a registered trade mark of the Yale & Towne Mfg. Co.

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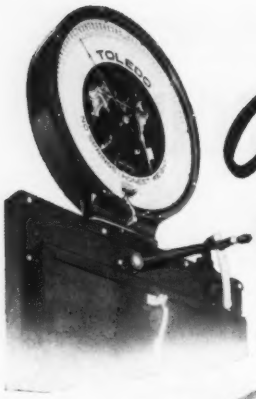

Control Costs ... at Every Step!

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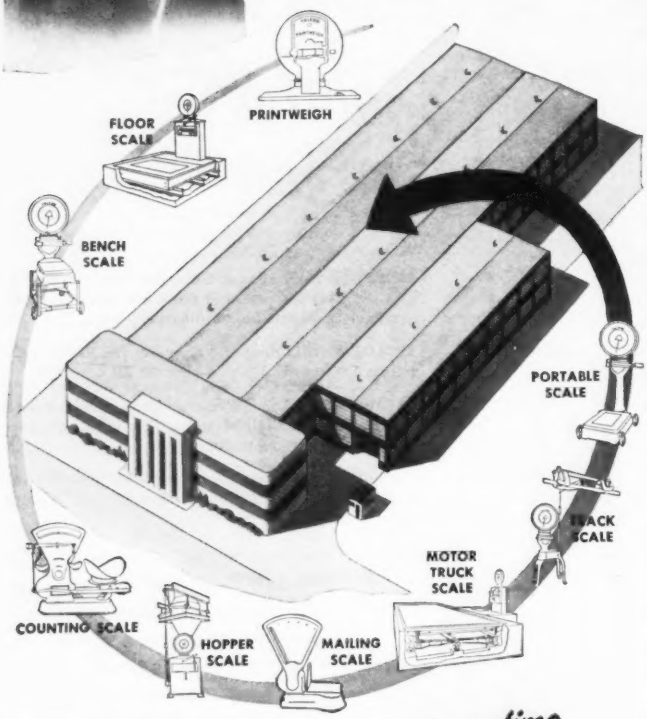

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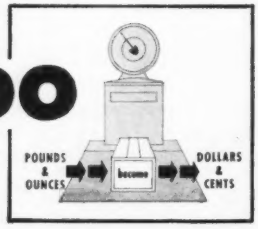
Every time ON YOUR SCALES MATERIAL BECOMES MONEY



TOLEDO

HEADQUARTERS FOR SCALES

employed. In the first, there is partial vaporization. Then an auxiliary vaporizer—heated by water from the engine cooling system—completes the job of vaporization. The second gas regulator then meters the fuel to the carburetor.

The fuel—now in gaseous form—is sucked into the carburetor along with the proper amount of air. Three carburetion systems are being tried at Omar: Hughes (manufactured by A. O. Smith Co., Chicago); Century (made by Century Gas Equipment Co., Lynwood, Calif.); and J. & S. (J. & S. Carburetor Co., Dallas).

At the present time, all the trucks' gasoline tanks have been left in place and kept full—just in case. The old gasoline system can be switched back on in a very short time. This precaution has yet to be used, however.

To operate the LPG system economically, a handy supply of fuel had to be made available. Consequently, Omar has installed a 30,000 gal. storage tank adjacent to one of its rail sidings, along with a special cylinder-loading station (see photo). Deliveries to the tank are made by rail tank car (diagram).

To service the 130-truck fleet, 500 cylinders are required. Roughly half of them are on the trucks, while the others are either being refilled or are in transit between the loading station and the Omar garages.

In the preliminary tests, it was found that the standard LPG cylinders—the type normally positioned vertically with the gas removed from the top—were too big for the panel delivery vehicles. Therefore, a special bottle had to be designed and subsequently approved by the I. C. C. The new design has a 12½-in. dia. and 4½-ft. length—including the 10-in. deep ring collar protecting the valves.

Pressure in the bottles varies according to butane-propane proportion and the outside temperature (normal range: 100 to 200 psi.).

End (*Resume reading on page* 141)

GF-Brazil Tapioca

—*Continued from page* 58

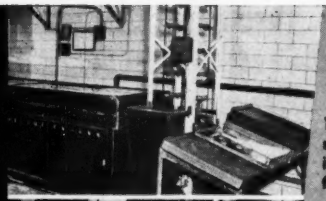
ating principle is the same as that of the Bird solid-bowl contrifuge, except that it cannot discharge a moist cake. The starch is re-slurried with fresh water before discharge. These units give quick separation of fruit-water from starch and cellulose prior to tabling. One such centrifuge serves an installation for 50 tons per day.

Machines of this type may even be utilized to prepare clean tapioca flour of negligible cellulose content without the use of starch tables or decantation

Volume Baking

at H. C. BOHACK CO., Inc.

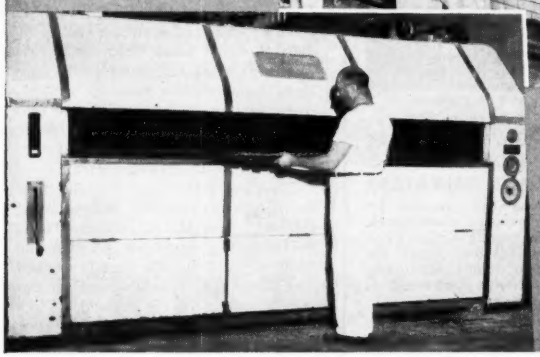
demonstrates versatility of GAS



1,000 dozen doughnuts a day are fried in the Ja-Lo Gas-fired fryer.

3 Fish Rotary Hearth direct Gas-fired ovens at Bohack. Baker loads one oven with pies—about 8,000 pies a week are baked here.

Bakers sprinkle flour on "Home Style" bread loaves prior to baking in the Gas-fired Baker-Perkins travelling oven.



Fifteen-tray Baker-Perkins Diathermatic Gas-fired oven bakes cakes and other sweet goods at H. C. Bohack Co., Inc.

Bakery staples at H. C. Bohack Co., Inc. of Brooklyn, New York, are baked in large volume with Modern Gas-fired Equipment.

250,000 loaves of bread a week,
8,000 pies a week, and
12,000 doughnuts a day

are examples, in addition to which cakes and other varieties of baked goods are prepared in quantity.

The Modern Gas Bakery Equipment at Bohack includes:

- Baker-Perkins direct Gas-fired travelling oven
- Baker-Perkins "Diathermatic" 15-tray Gas-fired cake oven
- 3 Fish Rotary Hearth Gas ovens for baking pies
- Gas-fired Ja-Lo Vitamatic doughnut fryer.

H. C. Bohack Co., Inc., is one example of how GAS serves the Baking Industry. Gas-baking gives the baker the temperature he wants —when he wants it, quickly. Gas is the versatile, modern, baking fuel, because GAS is clean, GAS is efficient, and GAS is economical. Find out the facts on Modern Gas Equipment from your Gas Company Representative. Call him today.

MORE AND MORE...
THE TREND IS TO GAS
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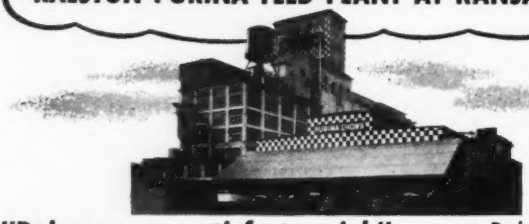
DAY-ENGINEERED DUST CONTROL SERVES RALSTON PURINA FEED PLANT AT KANSAS CITY



"Doing a very satisfactory job"... says Ralston Purina

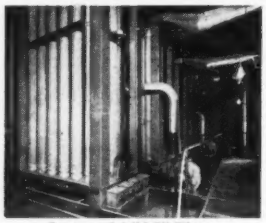
With reference to the DAY Dust Control equipment installed in various of its properties, the Ralston Purina Company is well satisfied. Shown here is the Purina Chows plant at Kansas City, Missouri, where a DAY Dust Control System was installed in 1951. High feed production with efficient dust control is the report from this plant where a complete line of more than 50 poultry and animal Purina Chows are processed at the rate of 1,000 tons daily.

DAY ENGINEERS DUST CONTROL FOR ALL SIZED PLANTS IN THE FEED AND FOOD PROCESSING INDUSTRIES . . .

Whether your operation is large or small, whether it is a feed or cereal plant, food processing plant, candy factory, mill or elevator, DAY engineers will advise you and help you solve your dust problem. You will benefit from The DAY Company's 71 years' experience in engineering, manufacturing and installing dust control systems, and its unceasing efforts to develop equipment for the most efficient and economical dust recovery.

WHAT DAY DUST CONTROL WILL DO FOR YOUR PLANT

DAY Dust Control effectively: (1) recovers valuable product, handling several different product streams simultaneously without mixing; (2) removes obnoxious dust; (3) minimizes plant hazards; (4) improves working conditions and labor relations; (5) cuts maintenance and housekeeping costs; (6) eliminates neighborhood dust nuisances; (7) reduces pest infestation and product contamination.



Battery of 4 "AC" Filters installed in the above plant.

WHY DAY "AC" DUST FILTERS MEET THE NEEDS OF FEED AND FOOD PLANT OPERATORS

Continuous-Automatic Operation: no filter shutdowns for cleaning or rapping . . . reverse air jet rings move slowly up and down the tubes, cleaning them continuously . . . with a maximum cloth area loss of only 1¾% at any time.

High Filtering Efficiency: with gentle, yet positive reverse air jet cleaning, high grade filtering felt is used resulting in higher filtering efficiencies. Also, the use of high grade felt allows higher air-to-cloth ratios of 10, 15 or even 20 to 1 with uniform back pressures.

Constant Air Volume: with shutdowns for cleaning eliminated because of the continuous, automatic cleaning action of the filter, constant air volume is assured. Back pressures level off after starting and remain uniform.

The DAY Company
ENGINEERS, MANUFACTURES, INSTALLS:

- Dust Control Systems
- Dual-Clone Dust Separators
- Spouting and Leg Casings
- Pneumatic Conveying Systems
- "AC" Dust Filters
- Exhaust Fans
- Bulk Storage Bins
- Vacuum Type Bag Cleaners

For engineering assistance and cost estimates
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DAY SINCE 1881

The DAY Company

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Branch Plants in Fort Worth, Buffalo and Welland, Ont.

tanks. To do this, slurry is fed at 5 to 10 percent above the centrifuge capacity. The discharged fruit water then carries away practically all of the cellulose, together with a small amount of starch, which is recovered later. A second centrifuge is used for washing the starch.

A recently completed plant has no tables or washing tanks. It is equipped with starch separators and starch purifiers made by the Swedish De Laval Co.

The practice of clearing starch tables with a stream of high-pressure liquid was introduced at one plant. Equipment consists of a centrifugal pump, a long rubber hose with nozzle, a tank with agitator, and the necessary connections for recirculating the slurry. The installation saves labor, permits frequent clearing of the tables regardless of the amount of starch deposited on them, reduces fermentation, and improves product quality.

This innovation (which made it possible to clear tables every 12 hr.) and use of SO_2 were the main factors contributing to the increased proportion of acceptable flour in 1950.

Several progressive plants have switched to the use of 6-ply paper bags for shipment of the dried flour. Semi-automatic bag filling machines are used, but check-weighing is necessary.

At a number of plants, a sample of dried flour is taken from each 750-1,000 kg. batch and immediately analyzed for mesh size, moisture content, color, foreign contamination, and cold viscosity. When defects are found, their causes are traced and the faulty processing is quickly corrected.

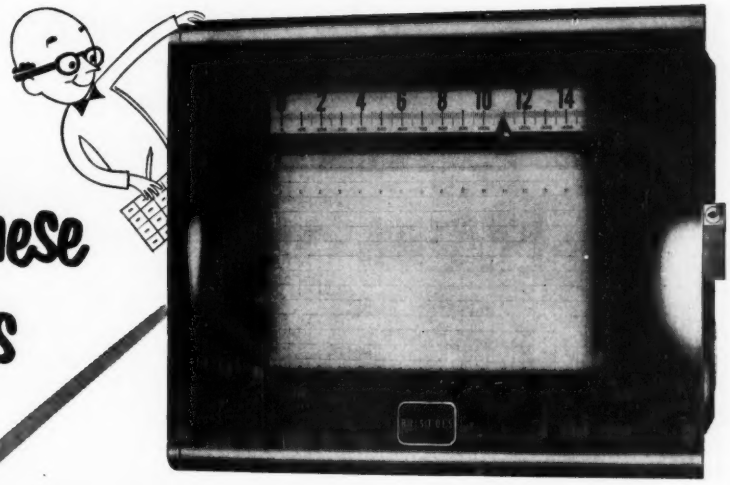
Complete lots ready for shipment are similarly analyzed before being released. Weights of incoming roots and outgoing flour are recorded. In 1950, a rapid specific gravity method was developed for estimating the starch content of the roots.*

Those who took part in this cooperative program feel proud to have helped a native Brazilian industry attain a more favorable position in the world market, while at the same time opening up a reliable source of supply in the Western Hemisphere.

Especially cited by General Foods is the unstinting support of the Brazilian interests and the notable contributions of the staff of Geismar Cia., Ltda., of Sao Paulo, Brazil, and New York City, and particularly Flavio B. Cabral of that company.

* Described in following articles by G. Van Blema and F. B. Cabral: "Metodo Rapido Para Calcular o Amido Nas Raizes de Mandioca," in *A. Fazenda*, (New York City) Oct. 1951; and "Metodo Rapido Para Estimar el Contenido de Almidon de la Yuca," in *La Hacienda* (New York City) Nov. 1951.

End (*Resume reading on page* 58)



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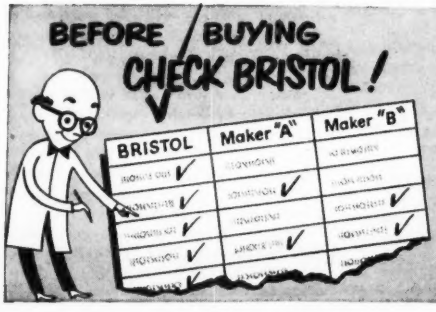
AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS



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115 Bristol Road
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Please send catalog giving details of Dynamaster performance to:

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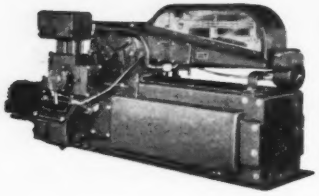
W&T MERCHEN WEIGH FEEDERS

Give Greater Product Uniformity



Weigh-blending of food ingredients—the only *accurate* way to blend—calls for precision equipment and "know-how".

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- Feed and weigh in *one* operation
- Handle ounces to hundreds of pounds per minute
- Manual or automatic control
- Easy accessibility
- Handy feed register
- Meet underwriters class II group G specifications

Your W&T Representative brings you the "know-how" from his experience in supervising and servicing hundreds of Merchen Weigh Feeder Installations.

Write today for Descriptive Bulletins.

WALLACE & TIERNAN COMPANY, INC.

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Questions & Answers

THIS MONTH'S PROBLEM

Question—As a processor of fruit preserves, we are experiencing considerable difficulty in controlling the solids content of our products. We cook in steam-jacketed kettles and closely supervise the batch-finishing point with frequently calibrated stem thermometers. Yet despite this close supervision, we sometimes get refractometer readings as much as 4 or 5 deg. Brix above a desired 65 deg. Brix. In terms of yield, this adds up to a loss of as much as 10 lb. per 250-lb. batch. What are some of the possible reasons for this deviation, and how can we control it?

Answer to January Problem

The Question Was—Our problem is making a line of aromatic fruit essences that will produce a stabilized, flavored syrup. Hence, we seek a typical formula for manufacturing such an emulsified product. Is there a stabilizing agent that we can employ to prevent a separation of essential oil or fruit pulp from the syrup?

Answer—A survey of various commercial methods has revealed that there is a stabilizer that will meet your requirements for keeping in suspension the essential oils and fruit pulp in a syrup.

Supposing you wish to prepare a lemon oil-emulsion syrup or soda. To emulsify the lemon oil and keep it in suspension, use 1-3 oz. of Irish moss solution per gallon of product.

We suggest that you try the following formula for a lemon oil-emulsion syrup: Take 2 av. oz. of Irish moss extractive and sift it into a gallon of water in a closed container (a syrup base can be used in place of the water). Stir vigorously and allow the extractive (or stabilizer) to soak 15 min. in the 150-deg. F. liquid.

After cooling to room temperature (75 deg. F.), add the gallon of the emulsion to 55 oz. of water containing ⅛ oz. of a 0.1-percent solution of sodium benzoate. Now slowly add 7 oz. of lemon oil and, at the same time, stir vigorously. Finally, run the product through a colloid mill or homogenizer.

Curbing Bottle Chipping

Question—The heels of quite a few of our beverage bottles are chipping off. Can you suggest how we can prevent this condition?

Answer—It is possible that the bottles you are feeding into the soaker are too cold. Consequently, when a heel contacts the hot caustic solution, before the main body of the bottle, it immediately chips.

Suggested remedy is to raise the temperature of the pre-rinse water so as to pre-warm the bottles sufficiently and thus prevent breakage when they come in contact with the hot caustic.

More on Hazy Wines

Question—Referring to the question on "Hazy Wines" in your November Q&A, we have also run into a curious, yet somewhat different, problem with some of our white wines. After this product is bottled and sealed in shipping cases, it soon displays a slight turbidity. But when a bottle (white glass) of the turbid wine is removed from the case and exposed to light, the cloudiness disappears. And then the wine becomes hazy when it is kept in the dark. Removing the cork, as cited in the November question, does not clear up the wine. What's responsible for the cloudy condition? And how can we prevent it?

Answer—In your case, the turbidity is likely caused by iron. Wines containing over 5 ppm. of iron are apt to cloud, due to the precipitation of organic complexes of iron (ferric) phosphate. The more iron in your wine, the more objectionable will be the turbidity. And those wines that have a high alcohol content and low acidity are most likely to develop an iron haze.

Unlike copper cloudiness, iron haze occurs under conditions that favor oxidation. In the former case, turbidity is due to a reduction of copper—from the cupric to cuprous state. Ferrous iron, however, does not form

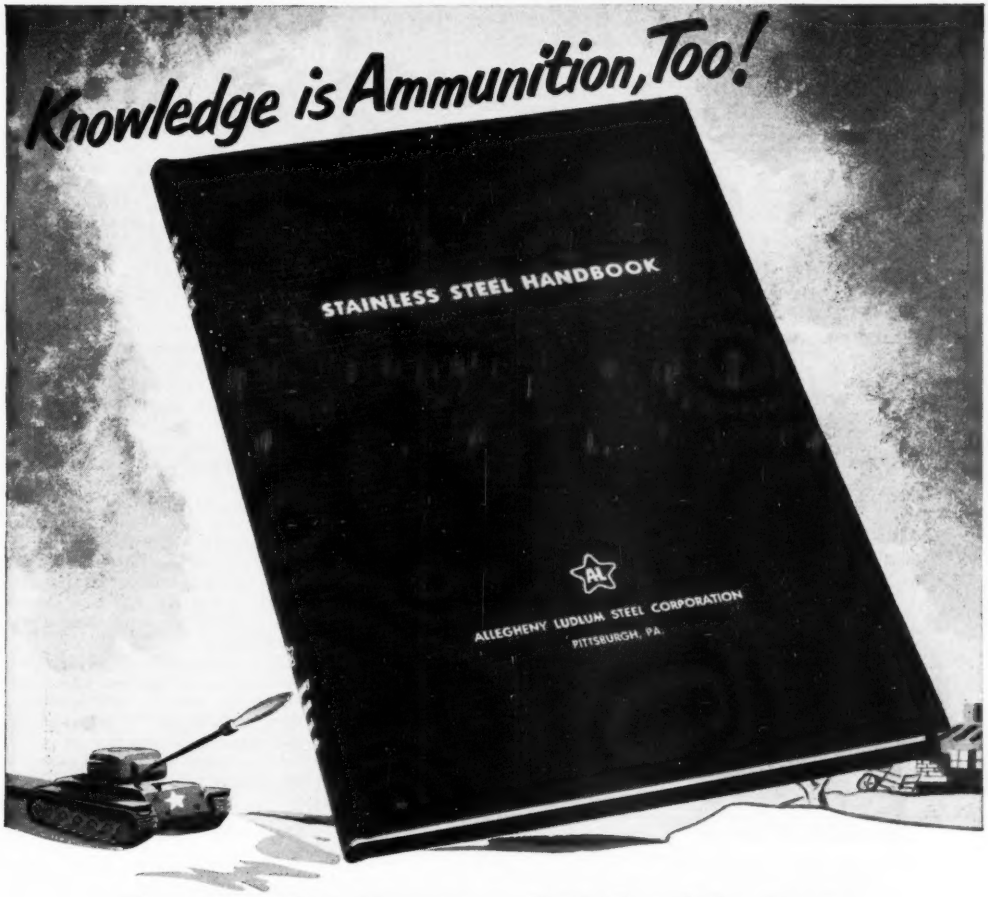
How Would *You* Do It?

Readers are invited to submit to FOOD ENGINEERING answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

What Is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.



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cloudy wines, since it remains in an inorganic state and will not readily react with organic phosphates. Ferric iron, on the other hand, produces insoluble (haze-creating) complexes.

Occasionally, wines with a slight ferric phosphate haze will display the curious property you mentioned. When exposed to light, the wine will clear up. Reason: Insoluble ferric phosphate is reduced to the more soluble ferrous phosphate. Then, when the wines are removed to a dark room, the ferrous phosphate is oxidized to ferric phosphate, and the wines again become hazy.

Ordinary clarifying agents will completely remove ferric iron from the wines, but not ferrous iron. The latter remains in solution, subsequently oxidizing and causing turbidity. In the presence of sulfurous acid (formed by addition of SO_2 gas, employed by some wineries to sterilize the wines), iron remains in the ferrous state and the wine will later become turbid.

To avert iron haze, best practice is to prevent the wine from coming in contact with iron. Most wineries are now switching over to iron-free vessels, equipment, and hose connections. Others are even using Pyrex glass piping.

If you are using all possible precautions to prevent the wines from picking up iron, try adding about 1 ppm. of citric acid. It may be noted that removing ferrous and ferric iron by "blue fining" (fining with potassium ferrocyanide) is taboo.

Stabilizing Peanut Butter

Question—What is the difference between homogenized and hydrogenated peanut butters? And how can peanut butter be stabilized?

Answer—Usually, peanut butter is made up of a combination of No. 1 grade Virginia, Spanish, and Runner peanuts. Included are small amounts of salt (1-2 percent); sugar (1-2 percent sucrose or dextrose). Some manufacturers claim sugar aids the product two ways: Makes the peanut butter more palatable and retards oil separation.

Homogenized peanut butter is prepared in the same manner, except that the ground mixture is run through a commercial homogenizer. This unit forms a uniform, smooth-grind item.

In making hydrogenated peanut butter, on the other hand, a blend of two or three varieties of nuts is prepared after the blanching operation. This blend is then fed into a preliminary grinder. Next, the coarse-ground peanut butter is reground (and sometimes there is even a second regrind).

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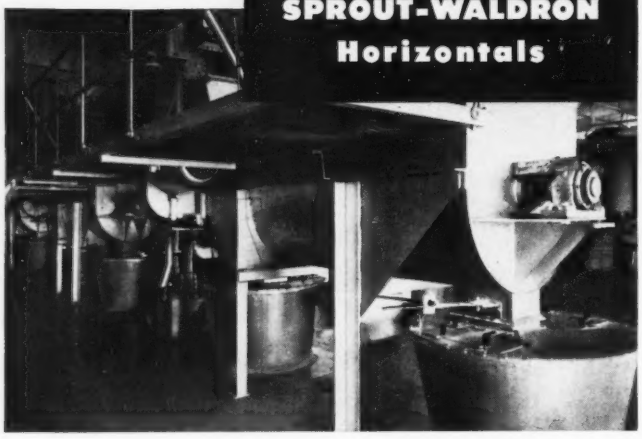

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salt, sugar, and stabilizer (hydrogenated vegetable fat or fats) are added. The product is then homogenized to produce a smooth, stabilized peanut butter.

Tomato Pickle Spoilage

Question—A month or so after our completion of an order for 6,000 12-oz. jars of sweet green tomato pickles, fermentation took place in some of the jars. As a result, the entire lot had to be dumped. Chemists informed us that insufficient sterilization of the product was the cause of our trouble.

To better acquaint you with our problem, here's a brief on how we pack these pickles: Sliced onions and green tomatoes are immersed in brine. Next, surplus brine is drained from the onions and tomatoes. Vinegar, sugar, and spices are added, and the mixture is boiled for about 20 min. With no preservative added, product is packed lukewarm into jars, which are capped when cold. Here, we used pulp-lined screw caps, lightly oiled to prevent rust. Caps were not sterilized.

While we agree that there is a possibility of contamination during the cooling-off period, we believe that immature tomatoes may also have been instrumental in this rapid fermentation. A shiny green tomato is, no doubt, mature. But would a dull-colored tomato carry microorganisms that would hasten fermentation?

This pickle, when made in small batches, is extremely tasty and keeps well. Its very goodness made us decide to try to put it up on a commercial scale. However, it appears that some of the large packers shy away from this product. Is it because the combination of ingredients makes it difficult to keep? Doesn't the screw-type cap provide a proper seal?

Answer—It is quite possible that your spoilage was due to insufficient sterilization of the product. In the future, we suggest that you employ screw caps with synthetic rubber-gasket liners. Such caps can be sterilized prior to capping, and they will provide an air-tight seal.

As a further precaution, we would advise modifying your process in the following manner: After draining the brine from the sliced onions and tomatoes, soak the product 1 hr. in fresh water and drain again. Add the sugar and spices (the latter in a bag), bring to a slow boil, and continue boiling 20-25 min. Remove the spice bag, then pack the tomato pickles into clean jars.

Either of two packing procedures may be employed: (1) Fill the jars to the top while the product is hot, adjust the screw gasket-lined cap in place, and seal at once; or (2) heat

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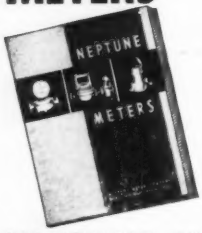

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product to boiling, fill into jars to the edges of the neck rings, then apply and seal securely the gasket-lined screw caps. Immerse all 12-16-oz. capped jars in boiling water for 5 min.; all 32-oz. jars for 8-10 min.

We prefer the second method because the final product is much crisper.

It is possible that your contamination took place during the cooling-off period, as the chemist informed you. It is suggested that you check the pH of your product—fermented and non-fermented samples.

Even green tomatoes just on the verge of changing to a red color contain spoilage organisms. Sort out the soft, dull-green tomatoes, since they can be highly contaminated.

Your product would be classified as a specialty item. And, for that reason, the demand would be limited. Thus, packing this product on a commercial scale by large food processors would not be justified.

It is not necessary to add a preservative, if this product is satisfactorily processed and packed in jars with the proper closures.

Wants to Make Feta Cheese

Question—I would greatly appreciate details on the manufacture of Feta cheese, particularly information on curing, temperatures, and brine concentrations. . . . I believe that this cheese is of Italian origin and that it is cured in brine.

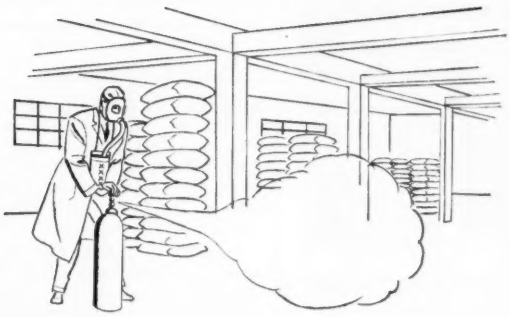
Answer—Here are the details on making Feta cheese: Set the skim with about 0.5–1.0 percent of lactic starter at 88 deg. F. Now add 3–4 oz. of rennet extract. After coagulation occurs (30–40 min.), cut the curd with ½-in. knives. The curd is finished looking like brick cheese.

The skim milk curd is prepared in a vat by methods about the same as for making brick cheese. However, instead of dipping the curd into many small forms, it is transferred into a large wooden form (8x30x40 in.) mounted over a draining cloth on a table.

After the curd is well drained and matted, it is cut into oblong blocks (like loaves of bread). These are well salted on all sides and then returned to the form. Later in the day, they are turned over and again salted.

On the following morning, the curd loaves are cut into 1-in. slices, which are salt-packed into parafined wooden kegs holding about 125 lb. of cheese. The space between the curd pieces is filled with brine from the curd.

The cheese is ready to be eaten in 30 days. Flavor of this cheese is similar to that of a highly salted, acid cottage cheese.



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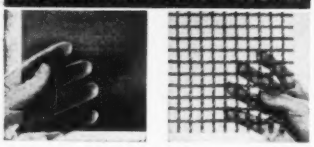

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FUNDAMENTALS OF SUPERVISION. *By Charles F. Harad. Published by Delmar Publishers, Inc., Albany, N. Y.,* 1951. 215 *pages;* 8 *x* 10½ *in.; cloth. Price* $3.75. *Conference Leader's Guide. (Supplementary to above),* 73 *pages,* 8 *x* 10¼ *in.; paper. Price* $2.

Training of plant foremen and supervisors is the aim of the course presented by the text of the first-named volume. When coupled with the supplementary guide—to be used only by group leaders—the course is seen readily adaptable to almost any industry.

There are three major sections covering company organization, self-analysis for supervisors, and the handling of workers. Each text unit (28 in all) first details the objectives of the particular chapter, next presents discussion material (usually based on actual shop problems), and last contains a series of written assignments (to assure mastery of each unit).

Fundamentally, the course is designed to improve the caliber on existing supervisory levels through a better understanding of the many interrelated factors in any company. As a result, such problems as getting increased production, handling grievances, and developing initiative are analyzed.

Latest Refrigeration Handbook

THE REFRIGERATING DATA BOOK, BASIC VOLUME, 7TH EDITION. *Editor in Chief: B. H. Jennings. Published by The American Society of Refrigerating Engineers,* 40 *West* 40*th St., New York,* 1951. 903 *pages;* 6¾x9½ *in.; leather. Price* $7.50.

A number of revisions mark this new basic data book. Besides rewriting of a few chapters appearing in the 1949 edition, the major timely improvements include addition of ew tabular information along with data on refrigerants, insulating materials, and practices that have come to the attention of the refrigeration industry in the past two years.

Commonly known as the "bible" of the industry, this book includes information on design, theory, thermodynamics, refrigerant properties, and related topics. Complete processing layouts, as well as maintenance and trouble-shooting programs, may be formulated with the handbook.

Air conditioning is discussed in detail, also domestic refrigeration systems. A classified index of the various vendors associated with the industry rounds out the presentation.

This basic volume complements the Society's volume on applications, which is revised every other year.

Facts on Fat Processing

HYDROGENATION OF FATTY OILS. *By H. I. Waterman, C. Boelhouwer, and L. J. Revallier. Published by Elsevier Publishing Co.,* 402 *Lovett Boulevard, Houston,* 1951. 254 *pages;* 6¼x9¼ *in.; cloth. Price* $6.50.

Much of the hydrogenation background on which this book is based was gained by the authors at Delft Technical University, the Netherlands. The approach to the subject, however, is markedly broad and well-balanced.

Presented are complete equipment descriptions and process flowsheets of commercial installations. And there are discussions of the theoretical chemistry behind this increasingly important field.

About half the 250 pages sketch the principal sources of raw materials for hydrogenation, the methods used to obtain and refine the oils, and useful world statistics.

The last half gets into the actual mechanics. Thermodynamic considerations, use of catalysts, reaction conditions, and selective hydrogenation are some of the phases considered.

Margarine people, in particular, are seen finding reference value in this treatise on the latest research in the fatty oil field.

Food Methods and Materials

FOOD INDUSTRIES MANUAL, 17TH EDITION. *General Editor: T. Crosbie-Walsh. Published by Leonard Hill Ltd.,* 17 *Stratford Place, W. I., London,* 1951. 1036 *pages;* 5¾x8¾ *in.; cloth. Price* 42s.

Arranged in encyclopedic form, this compilation of technical information on the what, how, and why of food manufacture may be used as a quick, general reference.

The first ten chapters deal with sections of the industry—such as milling, meat products, the dairy field, canning and preserving, and confectionery. And the others discuss food-product packaging, storage, and materials handling.

Not particularly strong in presenting the engineering aspects of food manufacture, this volume does, however, offer a tremendous amount of broad technical information in easily-

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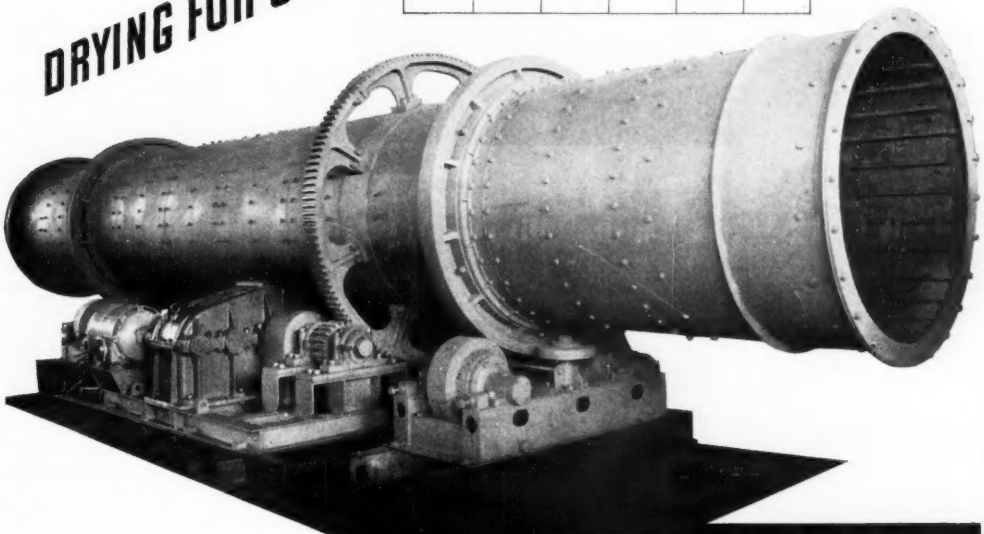

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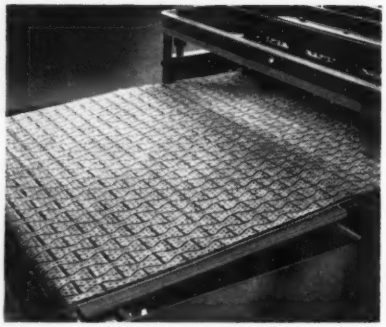

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Send us details of your food processing problem. Also a rough floor plan of your plant. Our engineers will make specific recommendations, without obligation.

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read form. Where raw materials are mentioned, the text lists sources, refining technics, uses, detection and estimation in foods, and literature references for the ingredient.

Many overall production figures, recipes, tables of physical and chemical properties, and analytical methods document this handbook.

Government Publications

MARKETING POTENTIAL FOR OILSEED PROTEIN MATERIALS IN INDUSTRIAL USES. *Department of Agriculture, Technical Bulletin* 1043. *Price* 30c. A report under the Research & Marketing Act by contract with Arthur D. Little, Inc., this publication offers a study to determine the present status of knowledge of oilseed protein meals in industry and to suggest potential new developments in both food and non-food applications. The material is largely of technological significance.

THE DEFENSE PRODUCTION ACT 1950, AS AMENDED BY DEFENSE PRODUCTION ACT AMENDMENTS OF 1951. *Office of Price Stabilization, unnumbered document. Price* 20c. This gives a composite of legal requirements in effect in late 1951. Important in dealing with many Defense agencies, in addition to OPS.

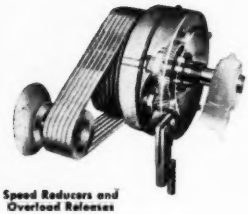
These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.

OUTLOOK CHARTS AND REPORTS. *Issued by Department of Agriculture in two sets, one dealing with domestic agricultural outlook, the other with foreign agricultural outlook.* Each gives an excellent graphic and tabular basis for analysis of raw materials and certain processed-food trends.

Also available from the Department are the "1952 Outlook Issues" for each of a dozen or more food raw materials and manufactured food products. Here, inquiries to the Department of Agriculture, Washington 25, D. C., should cite specific commodities or raw materials on which information is sought.

DIGEST OF SELECTED HEALTH, INSURANCE, WELFARE, AND RETIREMENT PLANS UNDER COLLECTIVE BARGAINING. *Bureau of Labor Statistics, Special Series No.* 6. Gives sample paragraphs from labor agreements seen valuable in showing acceptable ways for wording such contracts.

What's the speed reduction problem on your mind?



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Let's look at the problems—and the solutions. Your motive power probably runs at speeds upward of 1750 r.p.m. . . . your machine, slower than 154 r.p.m. You want to get that speed reduction efficiently and economically.

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The solution is an American shaft-mounted Speed Reducer. Because they are standard units, mass-manufactured, their initial cost is low. Because they are better built, by a company of long experience and top-flight engineering ability their maintenance cost is low. Because *any* speed from 11 to 154 r.p.m. can be attained from standard components, as easily and quickly as selecting an ordinary V-Belt drive, they eliminate design costs entirely. In addition they give complete freedom of machine location, permit complete flexibility of operating speed by making speed change a simple matter of changing sheaves or using American Adjustable-Speed Sheaves.

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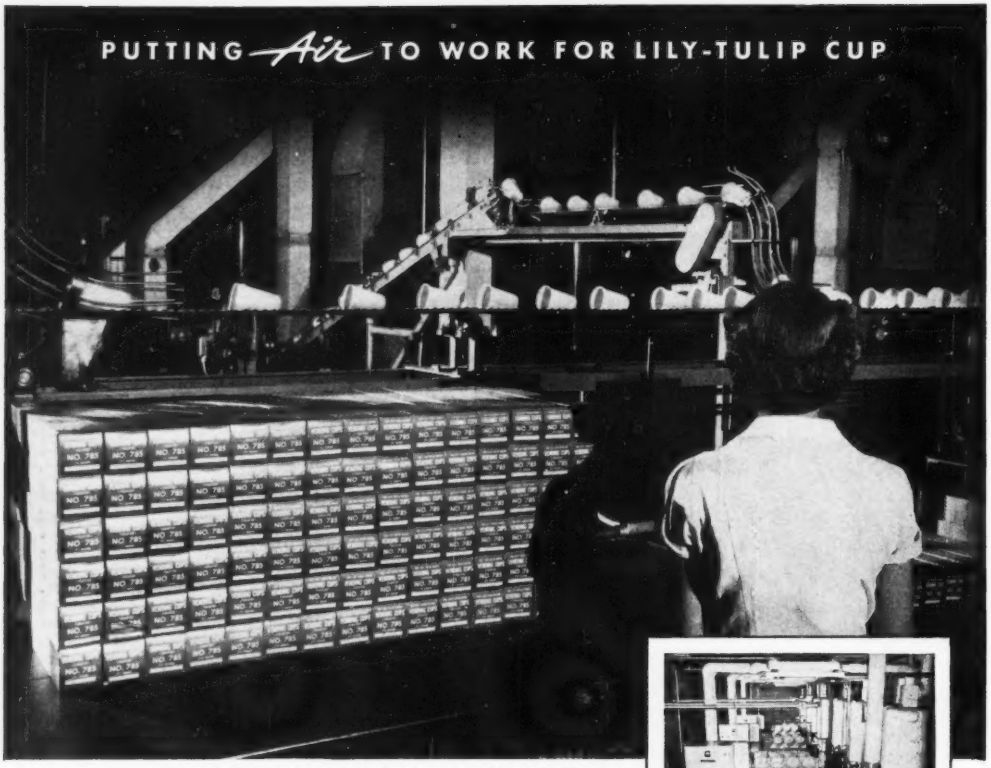

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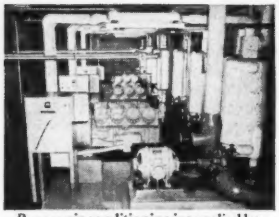
Industrial Contractor: P. Kretzer & Son, Flushing, N. Y.

HOW TO PAMPER PAPER IN EDUCATED AIR

Paper can be a Prima Donna in hot, sticky air. It's unpredictable—next to impossible to maintain any sort of uniformity in paper cup manufacturing operations. With millions of cups and food containers coming off the line daily at Lily-Tulip's Augusta plant, this could wreck production schedules.

But an even and controllable flow of 377,000 cfm of Westinghouse-conditioned air keeps the plant at 70°F. and 55% humidity to solve this temperamental problem. Add to this the benefits of cleanliness, healthier working conditions, higher employee efficiency . . . and you begin to see advantages of Westinghouse air conditioning.

We'll *put air to work* for you, too—with air conditioning, air cleaning or air handling apparatus. For information, call the Westinghouse Air Conditioning Distributor listed in the yellow pages of the telephone directory, or write Westinghouse Electric Corporation, Air Conditioning Division, Hyde Park, Boston 36, Massachusetts.



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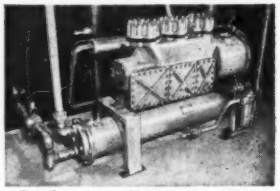

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KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Seaweed Yields Gel Agent

Discovery of a latent gelling agent that can be introduced into fruit concentrates prior to their freezing has been announced by a University of Delaware professor.

Extracted from a seaweed, the new agent is claimed to make tasty jams and jellies from almost any concentrated juice—using little if any sugar. George L. Baker, the inventor, worked under the auspices of the Haskell Research Foundation while perfecting his discovery.

It is stated that concentrates, with the agent added, can be used in four basic ways (depending on the method of preparation): (1) As a beverage, (2) gelled for salads, (3) as a dessert gel, and (4) as a spread for bread. Reports have it that even hard-to-gel pineapple juice "proves easy" with the seaweed extract.

Preparation is described as simple: Thaw the concentrate, with the agent previously added at the processing plant, and then cut-back with boiling water rather than the cold normally used.

When the hot juice cools, the gel forms. The agent is said to remain inactive during storage at freezing temperature.

Under-Pressure Canning

Pressurized food plants may soon be springing up throughout the country—if the radical Smith-Ball process proves successful. Plans for an early trial of this new technic were disclosed by Charles T. Townsend of the National Canners Assn. in an address at the recent Canners' Show in Atlantic City.

Designed to operate under about 20 psig., the plant offers many possible advantages in the canning of foods. At this pressure, water boils (or steam condenses) at 259 deg. F. Then foods may be pasteurized and equipment sterilized much more rapidly and surely, using room-pressure steam or hotwater immersion within the room.

Savings may be effected in reduced heat requirements (due to much shorter contact times), the elimination of heavy pressure vessels, and much faster processing rates. Product cooling is also said to be improved.

Workers will have to pass through special conditioning chambers to prepare themselves for work in the pressurized plant. However, estimates indicate that they will spend less than 20 min. per 8-hr. working day in compression and decompression chambers.

Developed at Smith Engineering Co. of Richmond, Va., the processing idea is expected to be put through semi-commercial paces this year in a pressurized Quonset-type plant.

Better Processed Eggs

The time-temperature relationship for effective pasteurization of liquid whole eggs has been further developed through research by the Poultry Branch of the Production & Marketing Administration in cooperation with members of the egg-breaking industry.

Holding for 3 min. at a temperature of 140 deg. F. (just below the coagulation level of 145 deg. F.), kills Salmonella bacteria often found in low-quality and dirty eggs.

Salmonella are extremely difficult to remove from raw-egg shells. Washing does not eliminate this contamination since the bacteria migrate inside the shell. And pasteurization at temperatures below 135 deg. F. has been found to stimulate its growth.

The process, when properly controlled, does not affect the commercial usefulness of liquid eggs in the manufacture of liquid, frozen, and dried whole egg products.

Equipment ordinarily used for pasteurizing milk may be used in this new process.

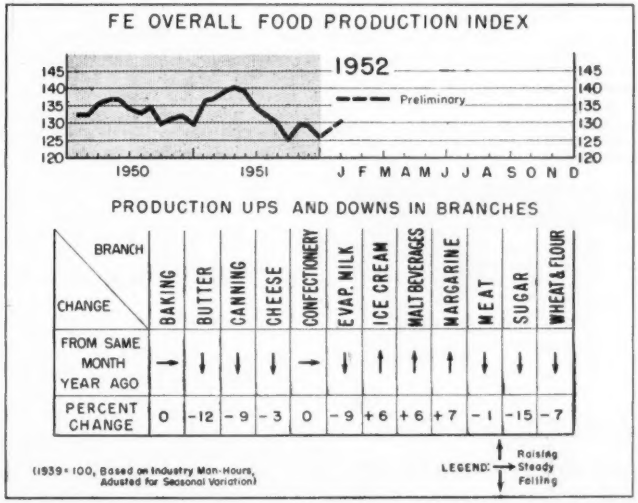
For Tightening on Pesticides

That the section of food and drug laws concerning pesticides ought to be overhauled in light of recent developments in the field was the conclusion of Dr. L. G. Cox of Beech-Nut Packing Co. in his recent testimony before the Delaney Committee hearings in Washington.

Pointing out that private industry is leading the move to purge foods of such chemicals, he explained how Beech-Nut has been spending well over $100,000 per year for the last six years on research and quality control in an effort to maintain minimum pesticide residues in their products. Of this expense, a large fraction has been incurred by having to reject vegetables and peanuts which had been exposed to DDT and BHC.

A near-zero tolerance level for pesticides in baby foods has been adopted by Beech-Nut. This policy was based on the chemicals' relatively high order of chronic toxicity, tendency to be stored in the body at low levels of dietary intake, and the lack of "adequate analytical methods of residue analysis."

Dr. Cox advocated a pesticide research and testing program that is



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Send for your COPY!

• **BULLETIN ON REQUEST.** Bulletin No. 100 shows how food packers are making profitable use of this machine and how you, too, can use it for closing small paper bags.

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MACHINE COMPANY
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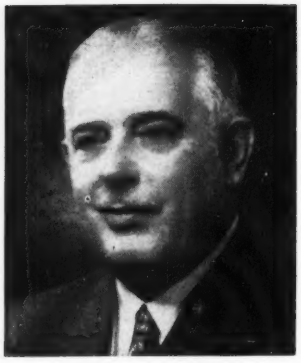

FRED C. HEINZ

Elected at Canner's Show

Hal W. Johnston was elected President of the Canning Machinery & Supplies Assn. at the group's annual meeting in Atlantic City held concurrently with the recent Canners' Show. He is a vice-president of the Stecher-Traung Lithograph Corp., Rochester, N. Y.

Also elevated during the Show was Fred C. Heinz, vice-president of the H. J. Heinz Co., Pittsburgh. He was named head of the National Canners Assn. Louis Ratzesberger, Jr., president of the Illinois Canning Co., Hoopeston, was elected 1952 vice-president of the N.C.A., while Carlos Campbell was re-elected secretary-treasurer.

better coordinated between private industry and the USDA. He also suggested stricter controls. His recommendations are briefed below:

The Department of Agriculture and at least four regional experiment stations should, he said, cooperate in testing new pesticides and in recommending their use "on a sound, scientific basis with protection to the farmer, the food processor, and the consumer."

The Public Health Service should, he continued, make necessary tests to establish proper tolerances for chemicals. Also, the F&DA should have full responsibility for enforcing such tolerances.

Laws should, he concluded, be enacted to require evidence of adequate toxicological testing, data on residues and recommendations for their removal, the publication of tolerances in the *Federal Register*, sample analyses on shipments, and warnings and seizures where tolerances are exceeded.

Okay Vermin Chasers

Bureau of Animal Industry has authorized use of certain new fumigants, sprays, and powders in food plants, under Meat Inspection Division supervision.

Allethrin may now be used on the same basis as pyrethrin, either in a deodorized kerosene spray or other approved carrier. Similarly, either normal propyl isome or normal-octyl dicycloheptene dicarboximide may be employed like piperonyl butoxide. And methyl bromide gas, as a fumigant, is now available with only the restrictions applicable to hydrocyanic acid gas.

These new authorizations of Meat Inspection Division supplements to Memorandum No. 52 indicate good practice for any food plant, not merely meat packing institutions.

Figures Fish Freshness

Details have been released on a quick but practical method for chemically determining freshness in fish. The test uses as its criterion the amount of a mercuric chloride-induced precipitate formed in a slightly acid aqueous extract from the fish flesh.

The extract is prepared by stirring 5 to 10g. of chopped fish tissue with 10 times its volume of distilled water prior to filtering. This filtrate is then added dropwise to 5 cc. of each of two solutions. The first—Solution A—is made up of 1 percent mercuric chloride. Solution B differs from A in that it contains 0.05 percent acetic acid.

No turbidity in either solution (when the filtrate is added in excess) indicates fresh fish. Slight turbidity in A and none in B shows that spoilage is starting. A precipitate in A and slight cloudiness in B indicates early decomposition. And precipitates in both A and B forewarn of advanced spoilage.

Basis for the precipitate formation is a reaction between the mercuric chloride and decomposed protein. If the fish extract is on the alkaline side (normally slightly acid, pH 6.0-6.2), an error may be introduced through secondary precipitates.

The new technic was developed by K. Amaro of the Tokai Regional Fisheries Laboratory, Tokyo.

Urge Safety Laws

More Federal legislation to improve industry's safety standards is called for by Secretary of Labor Maurice J. Tobin. A definite campaign for this purpose is expected in this election year, since such subjects have political glamor.

One procedure certainly to be urged is Federal legislation harmonizing with the suggested model law for states on the subject of occupational health and safety. The state bill so proposed by the Department was publicized nearly a year ago. At the moment, the Secretary does not say just what he thinks would be the logical companion Federal law.

Another legislative possibility is that Congress may appear to take seriously such a bill as that by Senator Humphrey (S. 2325). It proposes to create in the Department of Labor "a bureau of accident prevention for the purpose of promoting and maintaining safe and healthful conditions of employment in industries affecting commerce."

This latter measure would require an elaborate bureaucracy, including a nine-man accident prevention board for each industry. Such boards would have power to make rules and regulations and would unquestionably develop an elaborate regulatory system, if established.

Critics of these legislative proposals

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Fuller WET MOP

Absorption ... rinsing qualities ... tensile strength ... you get them all in a Fuller Wet Mop. Together they add up to standard quality. You expect it in any wet mop, but you don't always get it. But Fuller guarantees standard quality because Fuller Wet Mops are laboratory-controlled. Our modern research laboratory is constantly testing cotton yarns to ensure the proper balance of absorption, rinsing qualities and tensile strength.

Fuller Industrial Wet Mops are made of three types of cotton yarn — Fuller Standard 4 ply, Heavy Duty 9 ply and 30 ply, in three types of construction — narrow tape, wide tape and solid head, weights from 12 ounces to 32 ounces. Whatever your mopping needs, there's a Fuller Wet Mop that can do the job best. For complete specifications; write to ...

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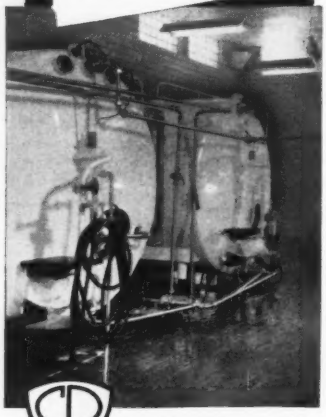
THESE TANKS CAN HELP YOU SAVE MONEY . . . .



CP Cylindrical
COLD HOLD STORAGE TANKS

Improve and simplify your liquid storage and holding methods and you reduce processing costs. Here are a few of the ways CP Cylindrical Cold-Hold Storage Tanks help you do it:

Their cornerless, smooth-welded stainless steel lining and clean construction enable peak sanitation with least cleaning time and expense. Sanitary Rotary-Seal Stainless Steel Agitator eliminates servicing of stuffing boxes and packing glands—can be removed quickly for cleaning—and provides the "right" agitation at all times. Heavy cork insulation under steel outer shell insures high thermal efficiency. Full-dished heads and rugged design gives maximum structural strength. Available in 1000 to 5000 gal. capacities, with or without integral cooling equipment. Ask your CP Representative for data on all the savings features.

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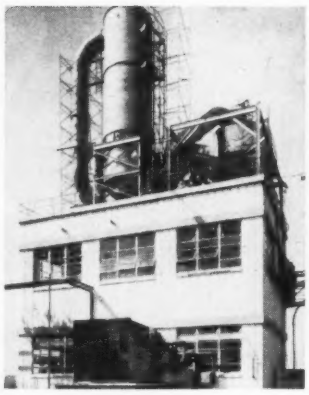


Flash Drying Starch

Outside view of brand new starch dryer building (left) shows roof-mounted, stainless-steel scrubber and cyclone separator of flash drying unit installed at the Hammond, Ind., plant of American Maize Products Co. Two Baker Perkins automatic centrifuges (right) prepare a filter cake for drying (32 to 40 percent moisture) from a starch slurry feed. High-velocity 600-deg.-F. air helps disperse and dry the cake. Designed to handle 300,000 lb. of starch daily, unit is termed first such commercial installation in U. S. (Its process will be the subject of an early FE feature article.)

urge that industry forestall passage of any new laws by making more effective effort to prevent accidents.

Obviously, this would deflate many of the proposals, since a very large percentage of all industrial accidents comes from individual carelessness or inadequate education of workers. It is argued that eliminating such causes would show both good faith on the part of industry and a materially lessened need for legislation.

Packagers to Meet

About 300 exhibitors are slated to display their wares to over 20,000 visitors at this year's National Packaging Exposition to be held in the Atlantic City Auditorium, April 1-4.

With more and more importance being attached to economical packaging, packing, and shipping, this 21st in the yearly series sponsored by the American Management Assn. should be well attended by food people.

A continuous demonstration of new technics for loading and unloading railroad cars and highway trailers will be on tap. A series of conferences will also be held simultaneously with the Exposition.

Backs Chemical Caponizing

The use of estrogens for chemically caponizing chickens was defended by Dr. Don C. Hines of the Eli Lilly & Co. at a recent Delaney Committee hearing in Washington.

Dr. Hines pointed out that translation of tests on animals to effects on humans was at least risky, and more often impossible. His experience with diethyl stilbestrol, and other estrogens, has led him to conclude "intermittent ingestion of pellets will not produce any permanent or harmful effects on men, women, or children."

Use of estrogen with a dye to mark the chicken at the point of pellet implantation was suggested to Dr. Hines. This technic would then prove whether the placement of the pellet in the fowl's head had been done correctly. The witness concurred that the idea might have some merit.

He also mentioned that, in his opinion, it would not be practicable for the F&DA to control the food use of estrogens at this time.

For Agricultural Studies

National Research Council is sponsoring a plan to organize an agricultural research institute to further scientific and technical investigations.

The organization is planned to work under the same blueprint that the Council has previously used in sponsoring independent non-profit research agencies.

Members of the new institute will be sought, by an organizing committee, among food processing firms and organizations as well as in the fields of agriculture and agricultural trades.

A recent conference at National Research Council asked that there be established an organizing committee

to draft by-laws and to suggest a financial plan. Definitely contemplated is a modest membership fee, with the money to be used to aid initial organization and insure the initiation of technical work on problems.

Rise In "B" Frozen Foods

The B-grade frozen foods are now catching on. In fact, it's predicted in some quarters that this standard or second-grade pack will eventually represent 50 percent of the entire industry's production.

Developed as an outlet for raw material reaching freezing plants which couldn't meet top specifications, the secondary grade is now seen as a general boon to the field.

However, several warnings have been posted recently: Processors and distributors alike are stressing the need for strong quality control programs on the B grades—remembering how quickly the public soured on poor

(*Turn page*)

Hors d'Oeuvres

• Check to see how a small Mid-Western bakery was coming up with such fresh and crisp cheese crackers showed that it was hickory-smoking all the salt used in its recipes. Later analysis uncovered traces of an excellent anti-oxidant carried by the smoke to the salt. Keep the home fires burning!

• *Prefer a juicy steak to a well-rounded calf? Well, apparently our servicemen do. A poll conducted at a Philadelphia USO club disclosed that the GI's placed food ahead of girls for off-duty recreation.*

• A recent survey of over 1,160 companies reveals that the traditional American morning-coffee break is now considered a valuable production tool for good morale and better quality output. No grounds for complaint, either.

• *The Argentine Government has decreed that all restaurants observe one meatless day per week—this move being understood to help Argentina meet her British commitments. Looks like Peron's censorship blanket doesn't quite cover all.*

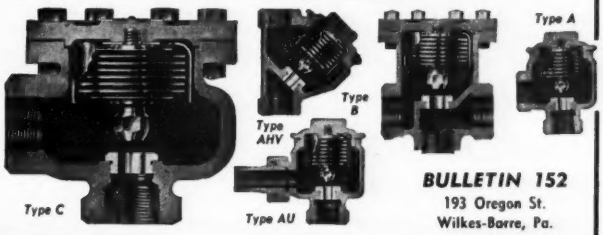
• An enterprising paint manufacturer, with an eye cocked toward the younger generation, is marketing a series of "edible paints" to be used on baby furniture. Wonder if they're seeking any experienced taste-testers?

• *The butter and margarine people may soon have to move over and make room for a new competitor—sycova—made from raw soy beans. It's said to be a less costly spread that will not turn rancid during storage. Now, whoever heard of a sycova lobby?*

Nicholson Traps Help

CUT STEAM COST $500,000 A YEAR

At one of the nation's large processing plants a campaign to promote economical steam use by improving heat transfer efficiency has resulted in a yearly saving of $500,000. Credit for a fair portion of this is given to improved steam trapping which resulted from the installation of Nicholson thermostatic traps. To see why an increasing number of leading plants are standardizing on Nicholsons for positive drainage and faster heat transfer, send for Bulletin 152.



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Available also without dial thermometer in a variety of 60° F. ranges and valve bodies ¾" thru 8".

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Simple • Economical • Dependable

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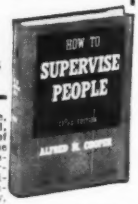
Supervision simplified—

How to get better results in supervision

plainly told in this guide to successful methods



This outstanding book is simple, easy to understand, easy to read, yet gives really practical facts of better supervision to use on the job. It covers all the typical supervisory jobs and problems of hiring, discipline, preventing accidents, promoting teamwork, training workers, delegating authority, labor relations, etc. It makes plain helpful techniques for handling them, with examples of typical problems and specific solutions now being used successfully and profitably in general practice. Question material that suits the book well for conference training is also included.

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HOW TO SUPERVISE PEOPLE

By ALFRED M. COOPER

254 pages, 5½ x 8, $3.75

This edition has been rewritten to bring it in line with today's conditions, but the practical viewpoint and simple, direct treatment that made the original book so helpful have been retained. It shows the supervisor and executive how to analyze his job requirements and responsibilities. The methods by which he may assume full responsibility for maximum production in his department, and for the development of a high spirit of morale and cooperation among his subordinates are given.

How to handle specific problems

The book gives you many practical suggestions for protecting workers' health and safety, building loyalty and interest and satisfaction in their jobs, promoting cooperation of other supervisors, reprimanding effectively, passing authority to assistants, getting instructions and ideas across by personal and conference training, etc. Especially delicate or difficult situations in handling workers are shown from all angles, then the solution is given. How to conduct conferences for educational purposes, or for gaining understanding and acceptance of new ideas, policies, etc., is clearly shown.

Tells you how to

- develop employee satisfaction
- handle malingerers
- delegate authority
- teach job operations
- prepare conference plans
- give positive orders
- keep the employees informed
- provide recreational areas for workers
- cure an employee of negligence

A discussion of the Taft-Hartley law as it affects the supervisor, an outline of a program for employee participation in management, and more case examples have been added to this third edition.

This is truly a valuable book to serve all supervisors, experienced or newly created, in shop, field, or office, also superintendents and executives. It brings them workable principles and methods for building morale, cooperation, and productive capacity among their subordinates and for developing their own leadership qualities as well.

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Send me Cooper's HOW TO SUPERVISE PEOPLE for 10 days' examination on approval. In 10 days I will remit $3.75, plus few cents for delivery, or return the book. (We pay for delivery if you remit with this coupon; same return privilege.)

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Position Food-3-52

This offer applies ot U. S. only.

frozen foods after World War II. And handling, storage, and display technics will have to be improved to economically and safely hold the product at the required temperatures.

Where U. S. Food Goes

A recent analysis by the USDA of our food stock-distribution pattern during the July 1950-June 1951 period shows that—

1. Civilian per capita food consumption is holding steady but is more than 11 percent over the pre-World War II rate.

2. Exports of 19.4 million tons were 25 percent higher than the preceding year and about 450 percent up over prewar. This increase had little effect on the level of civilian consumption, since exports were mainly grains, and supplies of these have been very large in recent years.

3. Exports accounted for 14 percent of the total quantity of U. S. food distribution, compared with 12 percent the year before and 16 percent two years before.

See New Oil-Seed Foods

Heretofore untapped sources of vegetable oils are being investigated at the new Institute of Oil Seed Technology of Texas A & M College. Flax, sesame, okra, sunflower, cucurbits, and sorghums are some of the crops under study.

The Institute hopes to find an off-season substitute for cottonseed—thus putting to use the expensive oil-mill machinery normally idle during this period.

New food uses for cottonseeds are also under scrutiny. So far, a sauce from the kernels and parched wheat appears to be one of the most promising. French-fried kernels may even serve as roasted nuts in brittle and fudge-type candies.

And the Institute is currently working on ways of making cheese foods from cottonseed. Protein curds similar in taste and texture to unseasoned cottage cheese have already been prepared. Further study, however, is necessary to determine their true merit.

On Sterilized Milk

A simplified method for milk preservation is claimed by Prof. N. V. Joshi of Bombay University in India.

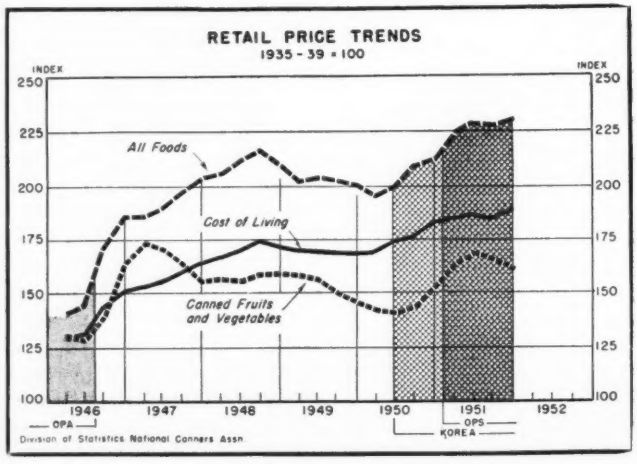
Two successive incubations at 212 deg. F. are employed. Each destroys a different group of spore-forming organisms. The second heating takes place after a fixed time interval—when the second group of spores is germinating.

Assay Shelf Products

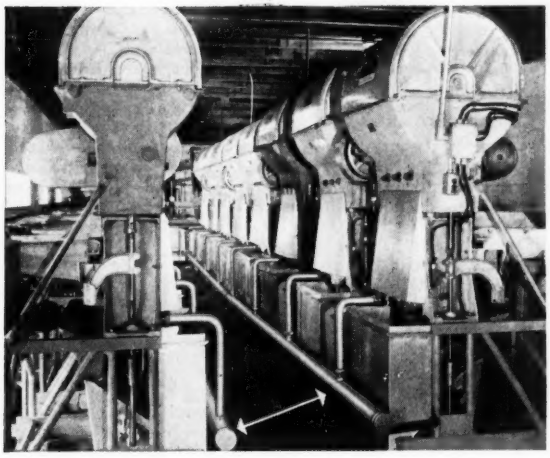
That canned foods can be counted on as sound sources of the diet essentials is emphasized by American Can's research group after examining the 42 scientific papers prepared and published by The National Canners Assn. and the Can Manufacturers Institute.

Over 30 different canned foods were assayed for their nutritive values during the studies. Some of the more interesting highlights include:

Pyridoxine, biotin, and "folic acid", recently identified vitamins, may be found in typical canned products. Another study showed that several canned fish (mackerel, sardines, tuna, salmon) are valuable dietary sources of vitamin D. Also the eight so-called "essential amino acids" are present in adequate



You Safeguard TASTE with lines made of *Carpenter* Stainless Tubing



As this plant's Superintendent would tell you, these 4" citrus juice lines safeguard the product's most important feature . . . its TASTE.

And in these days, when tubing or pipe may not always be in your plant when you'd like it, *long life* and *easy maintenance* become more important than ever before. That's what we mean when we say you get "more than corrosion resistance" from Carpenter Stainless Tubing.

When you want the sanitary advantages of Stainless, plus engineering or fabricating help that keeps processes going the way you planned them—put in a call to Carpenter, or your Carpenter Stainless Tubing Distributor. Our 23 years of experience with Stainless Tubing problems can be used to your advantage.

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Alloy Tube Division, Union, N. J.
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STAINLESS TUBING

Analysis — Tolerance — Finish

— guaranteed on every shipment

THE U.S. NEEDS YOUR STEEL SCRAP NOW

Hand Washing of Apples Eliminated

● All dirt and insecticide sprays must be removed from apples before processing—usually a time-consuming, manual operation. To speed up this step in his plant, a leading processor installed a Cyclone Flat Wire Belt equipped with flights. The apples are first dumped into a soak and then removed on the belt—eliminating all necessity for expensive hand-washing operations.

Cyclone's three belt types—Flat Wire, Chain Link and Flex-Grid — are designed to handle various processing problems in food plants. Our experienced engineers will be glad to tell you which belt will best meet your requirements. In the meantime write Dept. H-32 for a copy of our free catalog #4.

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METAL CONVEYOR BELTS

CYCLONE FENCE
AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL COMPANY
WAUKEGAN, ILLINOIS

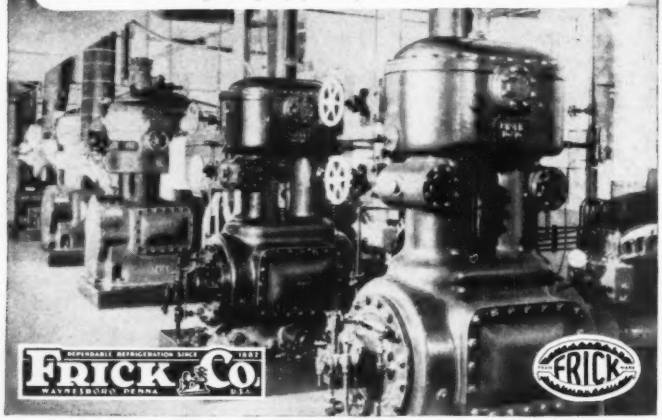
USS

UNITED STATES STEEL

Snow Crop Marketers Install Frick Refrigeration

Snow Crop Marketers, a Division of Clinton Foods, Inc., and one of the largest packers of quick-frozen foods in the country, has in operation at Lewiston, Idaho, a battery of five large Frick compressors which produce temperatures as low as minus 40 degrees F. Installation by Lewis Refrigeration and Supply Co., Frick Sales-Representatives at Seattle.

Super-dependability and economy have made Frick refrigerating machines the favorite with quick-freezers, as well as in air conditioning, ice making, and other cooling systems. Ask the nearest Frick Branch or Distributor today for an estimate on the refrigerating equipment you need.



DEPENDABLE REFRIGERATION SINCE 1882
FRICK CO.
WAYNESBORO, PENNA. U.S.A.
FRICK

quantities in canned meats and fish.

Processing affects the well-known vitamins—depending upon the duration and method. For example thiamin is seriously depleted by heat—with the more acid foods retaining their thiamin content better than the less acid ones, such as cream style corn. However, latest tests indicate that the newer high-short processing technics may up the retention of this vitamin considerably.

Storage studies at both 50 deg. and 80 deg. F. showed that carotene, niacin, and riboflavin values of the canned foods tested decreased only a slight extent over a two year period. On the other hand, the ascorbic acid in canned fruits dropped 15 to 30 percent during storage at 80 deg. F. for one year. At 50 deg., the drop averaged less than 10 percent. Thiamin content generally followed a similar pattern.

Spinach Prepack Costs

In the case of spinach and kale, prepackaging costs have been figured to be about 69c. per carton of twelve 10-oz. transparent film bags (excluding the ingredient costs).

The above figures are derived from the material and labor going into the preparation of the finished package—based on actual 1951 prices. The Maryland Agricultural Experiment Station and the USDA cooperated with a number of private concerns in obtaining the data.

Breakdown on the material cost per

Palletizing "Robotized"

Cereal cartons are mechanically palletized with this automatic loader at Battle Creek plant of Ralston Purina Co. Note that loader is handling two different sized cartons. Cases are fed directly from production line to palletizer, which loads and feeds pallets to a fork truck. An electric selector control system regulates flow of each sized carton to machine. Loader is made by Lamson Corp., Syracuse, N. Y.

NEW GUARANTEE OF "GOODNESS"

....Versene*

METALLIC CONTAMINATION SPOILS "GOODNESS"

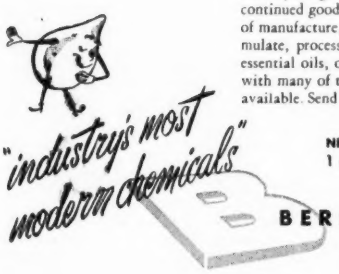
Food processors know that the metallic contamination found in most process water and containers spoils natural "goodness." It produces "tinny" taste, discoloration, cloudiness and off-color. It promotes rancidity, reduces shelf-life, destroys both fragrance and flavor. Nothing can compensate for such loss.

VERSENE* — SAFE PROTECTION

Now, for the first time, after years of toxicological research, done in accordance with the suggested procedures of the Food and Drug Administration, Bersworth makes Versene available to the food industry for the prevention of metallic ion contamination. When used for this purpose Versene is odorless, colorless and tasteless. Versene is non-toxic and safe when added in the small quantities needed for this purpose. Versene is made only by the Bersworth Chemical Company under processes originated, developed and patented by F. C. Bersworth. Only Versene has been so extensively tested for safety.

VERSENE* — GUARANTOR OF "GOODNESS"

When your good formula, product or process is affected by metallic ion contamination, Versene can insure its continued goodness. Exceptional stability at all temperatures and pH's, plus guaranteed quality and uniformity of manufacture, makes this powerful Chelating (complexing) Agent your safeguard against failure. If you formulate, process or wet-pack fruits, jams, jellies, vinegars, wines, syrups, clear sauces, oils, fats, vitamins, essential oils, or seafoods — investigate Versene for your own protection. Versene also works synergistically with many of the organic compounds widely used to prevent the development of rancidity. Chemical Counsel available. Send for sample and Technical Bulletin No. 2. Write Dept. T



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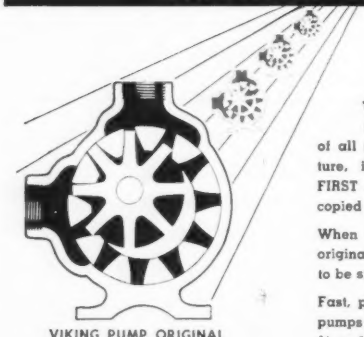
WHERE VIKING PUMPS LEAD ... OTHERS FOLLOW!



VIKING PUMP ORIGINAL GEAR-WITHIN-A-GEAR PRINCIPLE

Viking—the original "gear within a gear" pump is the most copied of all rotary pumps. Feature after feature, improvement after improvement FIRST appearing in VIKING pumps is copied by many manufacturers.

When you need pumps, specify the original "gear within a gear" Viking to be sure the pump is built for your job.

Fast, positive self-priming of all Viking pumps in the complete range of sizes, ½ to 1050 gpm, assures you of dependable pumping of either light or heavy liquids in the size and style needed.

Ask for descriptive bulletin D100E and E100E today.

See Our Catalog In SWEETS

Viking PUMP COMPANY Cedar Falls, Iowa

carton shows bags at 26.5c., cartons at 12.0c., and saddle leaders and staples at 2.0c. Labor was 28.0c. per carton during 1951—with 15.8 min. total time required per case of spinach and 17.0 min. for kale.

Make Known Service Needs

The Defense Department has just listed tentative 1952 armed forces requirements of canned fruits and vegetables. Prepared by the Army Quartermaster Corps., these estimates are subject to modification and are announced to assist industry in planning this year's production.

Procurement will be effected by the Chicago Quartermaster Depot, 1819 West Pershing Road, Chicago 9; and the Oakland Quartermaster Procurement Agency, 124 Grand Ave., Oakland 12, Calif.

The table below lists the requirements *in thousands of dozens of standard cases.* The industry's 1949-1950 pack is considered as base.

Fruits, 2½'s	Military Requirement	Percent of Base Pack
Apples	699	6.8
Apricots	1,143	14.3
Berries	317	15.4
Cherries, RSP	808	10.4
Cherries, sweet	70	4.5
Peaches	1,866	5.4
Pears	671	5.3
Plums	223	5.7
Figs	184	15.9
Cocktail	617	4.1
Pineapple	1,277	5.7
Pineapple juice	444	2.3

Vegetables, 2's	Military Requirement	Percent of Base Pack
Asparagus	456	4.8
Beans, lima	457	5.0
Beans, green	2,474	5.2
Carrots	563	10.9
Corn	3,580	7.1
Peas, green	3,081	5.7
Tomatoes	3,448	6.7
Catsup, tomato	1,305	6.0
Tomato paste	442	4.0
Potatoes, sweet	1,658	18.3
Pumpkin	389	8.9

Citrus Deal Stymied

For the moment, the big $32 million deal between the Florida Citrus Exchange and Clinton Foods (Snow Crop) is off, mainly because the Exchange wanted Clinton to guarantee it a plentiful supply of fruit.

Clinton's Board Chairman Richard M. Moss said that his firm was unwilling to make such an assurance. It will continue to operate its Florida operations as in the past.

Form Food-Vendor Group

The Perishable Agricultural Products Processing Equipment Manufacturers Institute held its official organizational meeting during the recent Canners Show in Atlantic City.

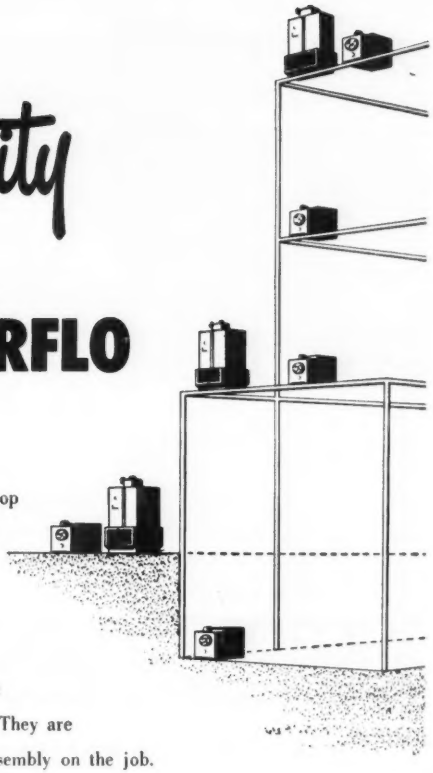
Robert A. Sindall, Jr., president of A. K. Robins & Co., Baltimore, was

any location any capacity

Just name the place . . . and

AQUATOWER or VAIRFLO

will do the water cooling job!



Indoors or out . . . on the ground or on the roof . . . on the top floor or in the basement—*there's a Marley cooling tower designed to fit any location and any cooling requirement.*

If your job is in the 3-ton to 60-ton range, you need an adaptable Aquatower—the compact, trouble-free cooling tower for indoor or outdoor use. Aquatowers are made in nine sizes and two styles to do each specific job economically. They are shipped completely assembled or "knocked-down" for easy assembly on the job.

In larger capacity installations the answer is a versatile Marley Vairflo . . . a broad range cooling tower with all the quality "extras" ordinarily found only in heavy-duty, high priced towers. The Vairflo, in steel or wood, harmonizes with architectural design. All material in Vairflos is completely prefabricated for simple job erection.

Whatever your need, select a Marley tower backed by the Marley guarantee and the "know-how" gained in more than 25 years of leadership in the water cooling industry. For more information, write for Marley bulletins AQ-51 and V-51, or call the Marley representative in your city.

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DOUBLE-FLOW TOWERS
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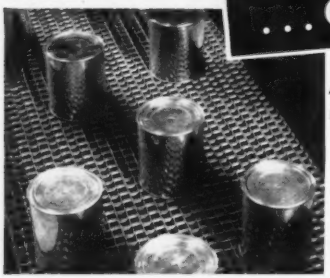
OUTPERFORMS
. . . OUTLASTS
All other types!



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FLEXIBLE STEEL
CONVEYOR BELTING

Adaptable to freezing, canning, deyhdrating, pickling and all other processes, versatile LaPorte Belting speeds manufacturing and packaging . . . boosts profits as it cuts costs.

Rugged LaPorte STEEL MESH CONSTRUCTION provides maximum strength, resists loading impacts. FLEXIBILITY provides a tighter grip on friction drum which prevents creeping, weaving or jumping . . . also insures a perfectly flat surface. POROUS CONSTRUCTION permits circulation of air and liquids around products in process and facilitates cleaning. Highly resistant to heat, steam and cold. *Choose LaPorte for top performance, longer trouble-free service.*

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Now...spot-registered imprints on small cartons, cans, canisters

NEW
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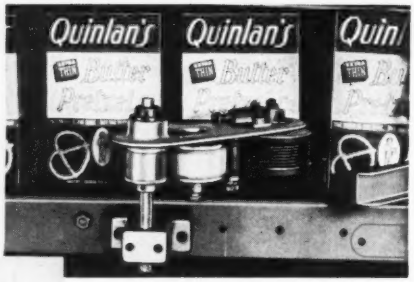
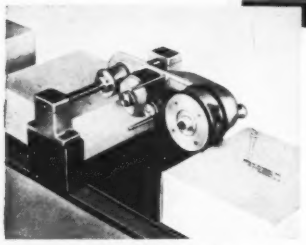
401





Why make a job out of marking? Let this new precision-engineered ROLACODER 401 imprinting machine mark code-dates, contents identifications, etc. on your package *automatically*. It's compact, versatile, designed for easy attachment to existing packaging or conveying equipment. Makes a single accurately-located imprint on any package with imprinting surface of 1¾" to 6¾". Friction-actuated . . . engineered for long-term efficiency on high-speed lines. Uniformly clean imprints assured by twin-roll ink transfer system and new Metalok diewheel that locks type securely, prevents slippage or movement.

▶ *See the ROLACODER and other automatic package imprinters at Booths 657-659, AMA Packaging Exposition, Atlantic City, April 1-4*

ADOLPH GOTTSCHO, INC., Hillside 5, N. J.

Gottscho

elected president of the newly formed Institute.

The group has been started to provide for its members a central clearing house for the solution of the many problems arising from our current national emergency. Executive offices will be maintained at 511 Fifth Ave., New York City.

Merges Food Groups

The Borden Co. announces formation of a new division to be known as the Borden Food Products Co. Formed through a merger of the grocery products, dry milk, and export divisions, the unit will be headed by Willis H. Gurley. Headquarters are to be in New York City.

Embracing a wide variety of products, the new company will handle, among other items, Borden's condensed, evaporated, powdered, and malted milks; soluble coffee; ice cream mixes; and skim milk powder.

Instrumentation Film

The "how" and "why" of pneumatic automatic instrumentation has been consolidated in an educational and entertaining 30-minute sound color-film entitled *Information at Work*.

Special attention has been given the food industry in this 16 mm. movie. It scans the entire broad field of pneumatic control in such a manner as to hold pointed interest for management, maintenance men and engineers.

It may be borrowed without charge from Taylor Instrument Companies, Public Relations Dept., 95 Ames St., Rochester 1, N. Y.

Glycol for Preserving

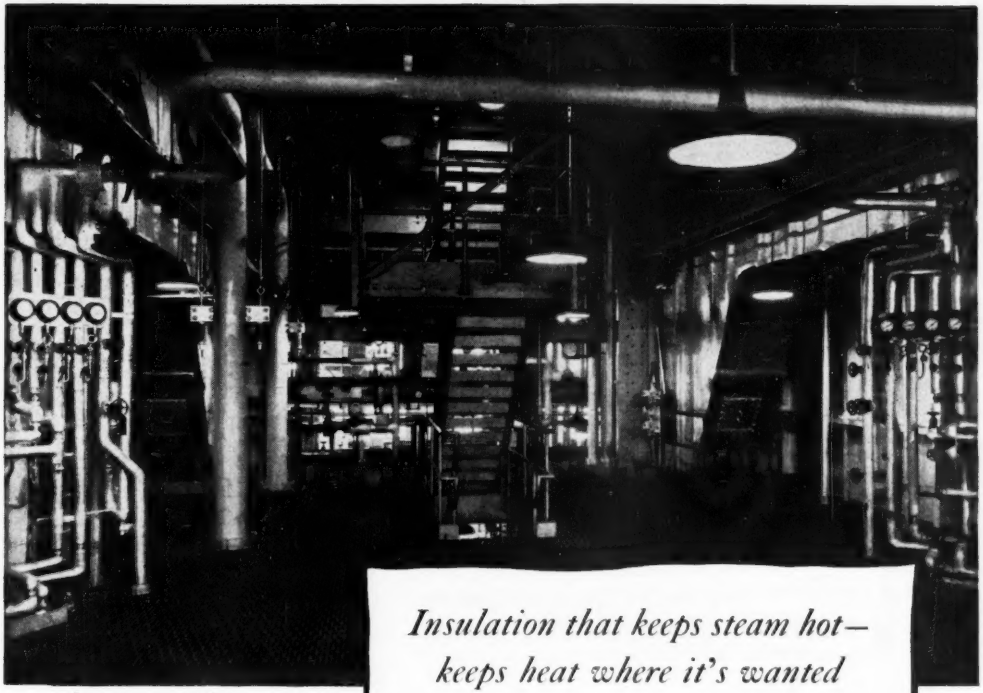
Ethylene glycol has definite possibilities as a food preservative, F. T. Brancato, Washington State College faculty member, reported at the recent convention of the Northwest Scientific Assn. in Spokane.

Brancato said that ethylene glycol greatly retards the growth of mold colonies. He pointed out that other glycol derivatives are already in use by orchardists to help preserve fruit after it's picked.

How Oranges Go to Market

Raising and marketing of citrus fruits, in the U. S. has shifted position over the past decade. The forcefulness of the change is clearly explained in a recent study of the Bureau of Agricultural Economics.

During the past season, only 37 per-



Large eastern power station:
Piping insulated with "Featherweight" 85% Magnesia, sewed canvas jacket; ducts with 1½" "Featherweight" blocks and ½" thickness of cement.
Insulation Contractor:
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Insulation that keeps steam hot—keeps heat where it's wanted

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"FEATHERWEIGHT" 85% MAGNESIA

—insulation that delivers more steam at less cost! For more than 60 years "Featherweight" 85% Magnesia Insulation has been known throughout industry for outstanding efficiency in all heating applications up to 600° F. You'll find it in power stations and steamships, in hospitals and food processing plants, in oil refineries and chemical installations—in fact, wherever exacting steam temperature control is a must.

And "Featherweight" 85% Magnesia not only gives you efficiency, but also extreme durability. It is structurally strong; can withstand reasonable amounts of compression, vibration, and contact. Physically inert, "Featherweight" will not spall or crack when subjected to the alternate heating and cooling of steam system start-ups and shut-downs. And, being entirely mineral in nature, it will not burn. In short, it is difficult to overestimate the efficient life of "Featherweight" 85% Magnesia. In most cases, it will outlast the heating system!

Your Keasbey & Mattison Distributor, who is an experienced applicator, will be glad to give you complete information on "Featherweight" 85% Magnesia. Or, write us direct.

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Flow settings on a WATEROUS Sanitary Pump stay constant. Internal clearances are fixed . . . there is no metal to metal contact between rotors and housing. There is no aeration . . . no squeezing of the product. From the moment the pump is started to the moment it is stopped, output volume remains constant. This positive control of volume is of vital importance in product transfer and accurate blending and mixing operations.

Easy to take down and easy to clean, WATEROUS Sanitary Pumps meet all 3A standards for sanitation. Thin, viscous or semi-solid materials are handled with equal ease.

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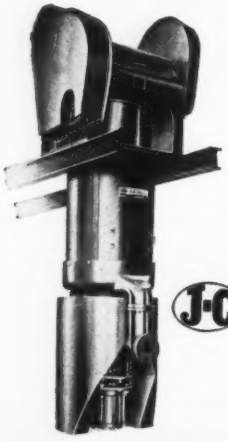
HAVING PRESSING PROBLEMS?

LET US HELP YOU AS WE HAVE HELPED THE FOLLOWING INDUSTRIES:



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CORN STARCH PLANTS: Dewatering germ and fibre.

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GLUE PLANTS: Maximum grease recovery and drier pulp.

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J-C ZENITH PULP PRESSES CONTINUOUS AND AUTOMATIC

Are stepping up profits through improved pressing efficiency. For applications to individual problems, for engineering or performance data, write Jackson & Church Company, Department D, at Saginaw, Michigan.

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"Work well done since '81"

cent of Florida's crop was sold in the fresh form, against 95 percent in the 1940 season. The trend is similar in California—though not as pronounced.

However, Florida has enjoyed almost all of the increased orange production since 1947—now growing almost two-thirds of the country's total crops of 110 million boxes.

Beneficiary of this shift has been the processor—frozen concentrator, single-strength producer, and hot concentrate packer. An estimated 35 million gallons of frozen concentrate were packed last year in the U. S. as compared with 10 million gallons in 1949 and 25 million in 1950.

Concentrate now represents about half of the processed pack in Florida.

Single-strength juice also has increased since before World War II—total U. S. pack averaging 22 million cases (equivalent No. 2 cans) since 1945, which is well above the 8 million average during the war.

Comparison of transportation costs for fresh as against processed orange products (Lake Wales, Fla., to N. Y. as of Sept. 1951) shows the factors favor the latter. Shipping a dozen oranges would have cost 6.4c., compared with 1.1c. for an equivalent quantity in the form of frozen concentrate and 2.7c. for single-strength juice.

USDA Grade Standards

Recent actions by Production & Marketing Administration of U. S. Department of Agriculture on U. S. Grade Standards and related activities include the following:

Raspberries for processing, new, proposed, page 773, Jan. 25 *Federal Register;* written comments received until Feb. 24.

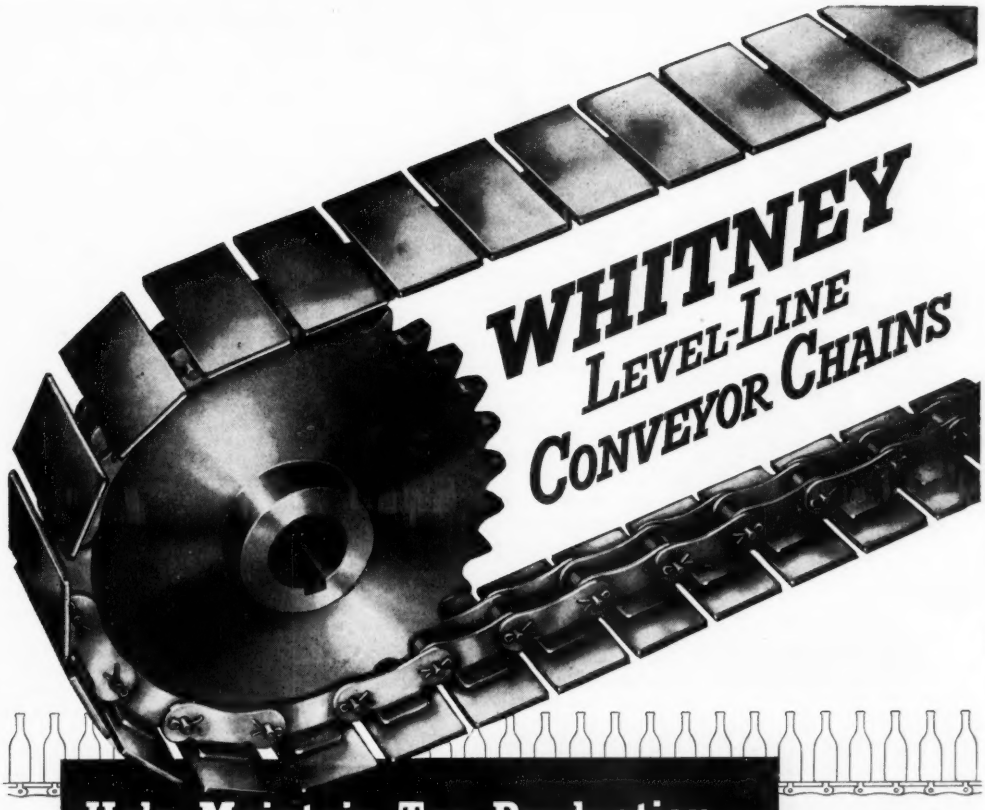
Flaxseed, revised, proposed, page 930, Jan. 31 *Federal Register;* deadline for written comments extended from Jan. 30 to Feb. 20.

Butter, revised, proposed, page 1224, Feb. 8 *Federal Register;* written comments received until Mar. 9.

F&DA Food Standards

Another month of slow progress was noted in the field of food standards of the Food & Drug Administration. Status of most standards has not changed since our last report.

Ice cream hearing advanced on schedule in early February when half a dozen witnesses appeared for Atlas Powder Co., testifying to the harmlessness of surface-active agents. A recess until mid-March is expected so that preparation can be made for adequate cross-examination of the recent witnesses. This will be followed by general



Help Maintain Top Production... Lower Unit Handling Costs

Smoothness of operation plus quietness and long operating life are the prime requisites in conveying. With Whitney Level-Line Conveyor Chains you are sure to get these and other benefits.

Here's how — the roller chain construction cushions and absorbs shocks . . . provides smooth, uniform delivery and discharge of materials without spillage or breakage. There is no chatter or vibration over any conveyor length. The level contoured plates, whose only function is conveying, assure safe transfer of material. There is no tipping, no catching. The smooth surfaces are easy to keep clean and sanitary. While the simple detachable design reduces down-time, provides lower overall costs . . . especially important in these days of high costs.

Whitney Chain Drives Keep Transmission Costs Down

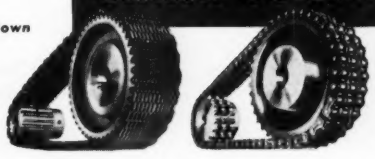
And remember, Whitney Roller and Silent Chain Drives provide positive power transmission without slippage or friction loss. Their all-steel construction of quality heat-treated steel assures long operating life with minimum maintenance.

Bottlers and food processors throughout the country have discovered the cost-cutting advantages of Whitney Level-Line Conveyor Chains. You, too, can keep your production going at top speed . . . reduce overall conveying costs by using Whitney.

Consult your nearest Whitney Field Office for recommendations or write for catalog and information.

WHITNEY CHAIN COMPANY
226 Hamilton Street, Hartford 2, Conn.

WHITNEY CHAIN COMPANY



The Colson® Universal Drum Truck

for fast, safe handling of drums and barrels

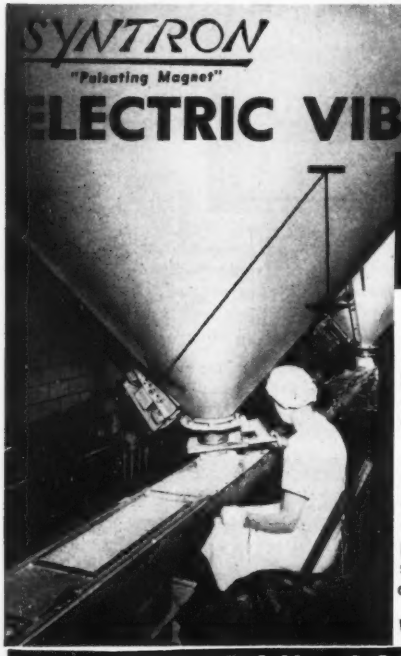
One man, with the COLSON universal drum truck, easily does the work of two. It locks any size container between the adjustable chimb hook and pick-up tips, lifts it easily and carries it with the weight evenly balanced over the wheels.

Other work-saving Colson materials-handling equipment includes hand trucks, platform trucks, Lift-Jack systems and wheels and casters to meet every industrial application. Write us or consult your phone book for the Colson office near you.

Write *Today for Free 56 page catalog.*

THE COLSON CORPORATION
ELYRIA, OHIO
CASTERS . . . . LIFT-JACK SYSTEMS . . . . INDUSTRIAL TRUCKS

SYNTRON
"Pulsating Magnet"
ELECTRIC VIBRATORS



Assure FREE-FLOWING BINS, HOPPERS AND CHUTES

Model V-75 Vibrators prevent the clogging of milk powder at a critical point in these Evaporators — — where powder moves into the conveyor.

Their 3600 vibrations per minute assure a smooth, effortless, flow of material — — and they can be applied to most any size and shape of bin, hopper and chute.

Write for catalog information

SYNTRON COMPANY
460 Lexington Avenue Homer City, Penna.

Schedule of Events

March

17–19—American Dairy Assn., annual meeting; Morrison Hotel, Chicago.
19–20—Canners, Freezers, and Fieldmens' annual short course; U. of Maryland, College Park.
21—Tri-State Packers Assn., meeting; Lord Baltimore Hotel, Baltimore.
30–31—Packaging Machinery Manufacturers' Institute, semi-annual meeting; Hotel Dennis, Atlantic City.

April

1–4—American Management Assn., 21st National Packaging Exposition; Auditorium, Atlantic City.
7–9—American Society of Lubrication Engineers, 7th annual meeting and lubrication show; Hotel Statler, Cleveland.
24–25—Pennsylvania Manufacturing Confectioners' Assn., 6th annual production conference; Lehigh U., Bethlehem.
28–30—American Oil Chemists' Society, spring meeting; Shamrock Hotel, Houston.
27–May 1—Society of American Bacteriologists, annual meeting; Boston.

testimony not previously placed in the record since the hearing began in January 1951.

Final order for *fruit preserves, jellies, and butters* is still expected very soon. Final orders for *frozen fruits* and *margarine* are also believed imminent. Expected later, but not necessarily in order of appearance, are final orders on *bread* and *canned mushrooms*, and a tentative order on *residue tolerances*.

Tentative orders on *canned pineapple* and *canned pineapple juice* will probably be much longer in coming, with some data on standard of fill for canned pineapple still scheduled to be received beginning Mar. 4. Standard of fill for the juice and standards of identity and quality for both the fruit and the juice will probably be held back until all six parts of the docket are ready.

—End—

Case History

—Continued from page 53

Gouverneur, this period has been lengthened to seven days.

4. The amount of concentration is also a limiting factor. At present, 3.25-1 is the limit for liquid-shipped concentrates. However, for cold storage and for powder, products are concentrated 4-1. There is reason to believe that both of these limits can be increased and a resulting saving effected in the storage and transportation of serum solids.

As the result of laboratory recommendations, the following before-and-after processing procedures are used:

JENKINS Bros. Salutes SUNSHINE BISCUITS, Inc. On Their 50th Anniversary

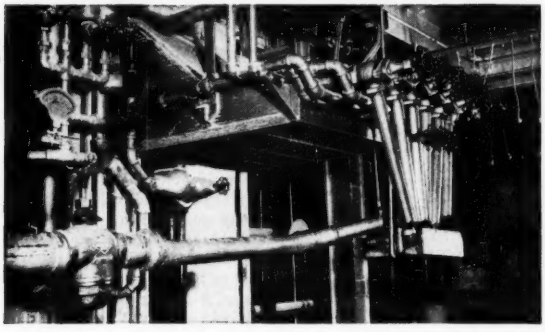
For enlargement of the Oakland, California plant of

Sunshine Biscuits, INC.

proved low operating cost

dictates repeated choice of

Jenkins Valves



Complex piping like this for distributing heavy syrups and mixes in the Sunshine plant is one of the toughest proving grounds for valves, seeking out the slightest defects in design and construction.

The repeated choice of stainless steel, bronze, and iron Jenkins Valves for these lines and such other vital services as steam, water, and sanitation, is a significant tribute to their lasting dependability.

Supplying the entire West Coast with Sunshine bakery and candy products, the plant is a model of modern food engineering.

For the second enlargement of their Oakland branch, already one of the largest food manufacturing plants on the Pacific coast, the Sunshine bakers repeated their valve selection for the original building. A decade of experience with the low operating cost of Jenkins Valves confirmed their prior decision,—that the only true economy is to install the best valves money can buy.

This confidence in the *extra measure* of efficiency and endurance built into Jenkins Valves is shared by plant operating managements in every type of industry.

Despite this extra value, *you pay no more* for Jenkins Valves. For new installations, for all replacements, let the Jenkins Diamond be your guide to lasting valve economy. Jenkins Bros., 100 Park Avenue, New York 17. Jenkins Bros., Ltd., Montreal.

JENKINS VALVES

LOOK FOR THE DIAMOND MARK

SINCE 1864 JENKINS

Jenkins Bros

heart of the strainer

A high-grade, woven Monel wire screen is the heart of the Yarway Strainer—one reason why hundreds of thousands of these strainers are policing pipe lines in nearly every industry.

OTHER REASONS—

- cadmium plated bodies and screen caps
- straight threads, machined faces and spark-plug-type gaskets on screen caps
- ten sizes from ¼" to 3"

Sold by 216 industrial distributors. Write for Bulletin S-203.

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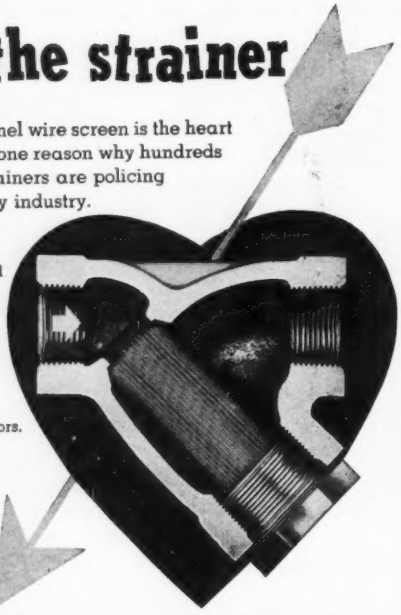
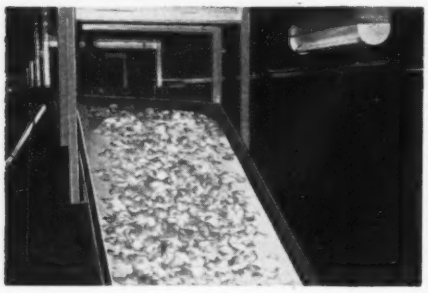
127 Mermaid Ave.
Philadelphia 18, Pa.



YARWAY STRAINERS



SUPRENE BELTING...

Likes Having Its Face Washed!

Wherever cleanliness is a factor . . . in cleaning fruits and vegetables, in the manufacture of biscuits, crackers, bread, candy and cheese . . . *sanitary, Suprene Belting is always in demand!* That's because it's so easy to keep clean! . . . washes like new with steam or hot water.

A superior cotton duck belt, Neoprene impregnated, it is highly resistant to the corrosive action of fats, greases and fruit acids. Odorless, tasteless and waterproof, Suprene Belting offers years of safe and sanitary conveyance. Available in a variety of plies and four styles to meet all your food handling requirements. Send for Bulletin 20.

Victor
Balata & Textile Belting Co.
53 Park Pl., N.Y. 7 • 300 W. Hubbard St., Chicago 10
Factory: Easton, Pa.

6639

1. At the start of operations, enclosed-system surfaces are thoroughly wetted down or filled with water and gradually heated to operating temperatures, then dairy products are started through. This pre-heating shows up leaks and prevents further ones resulting from pressure and heat-shocks. And, most important, it curbs burn-on within the system.

2. At the end of processing, cold water follows immediately behind the last milk through the system. This cools down heating surfaces and reduces possibilities of secondary burn-on. With little or no burn-on, cleaning operations are greatly simplified.

3. The cooling rinse water is immediately followed with a luke-warm soaking solution composed of 1 part mild acid detergent to 400 parts water. This is left filling all pieces of equipment in the continuous systems (except pans) until ready for dismantling and scrubbing.

The pans are further wetted down by spraying with a 1:100 solution of the acid detergent. This is done through the man-holes on top of the pans.

Scrubbing with suitable brushes, using the acid detergent and a fine scouring powder; followed by rinsing with clear, luke-warm water, complete the operation.

This procedure greatly shortens the cleaning period, is less corrosive, and more agreeable to employees.

Recent laboratory studies have indicated that technics employing higher heats may further remove oxidative tendencies, improve and control flavor, permit greater degrees of concentration without deleterious precipitations —thus effecting further savings.

End (Resume reading on page 53)

Industry Spending in '52

—Continued from page 66

status of outside financing, the availability of materials, and the like. But —things may actually run a lot easier. And so the ante may rise.

■**Any way you gage it, however, food is expected to remain one of the biggest industries for capital expenditures in the run of years through 1955.**

This year's expenditure figure of $769 millions is definite—no hedges—in its representation of work either now under way or blueprinted for action through December. It is indicated that some 53 percent will be laid out in this first half; 47 percent in the last half. As for the 1952-'55 plans, here assumptions are based on: (1) Defense tapering off, but gen-

"How are these new aluminum kettles doing?"

"Great, Mr. Clemens*, we've increased our production considerably."

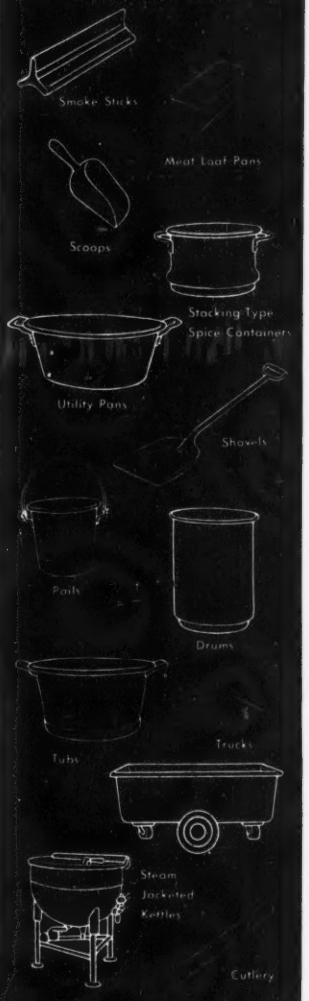
It's easy to understand why this and other food processors get enthusiastic about Wear-Ever Aluminum Steam Jacketed Kettles. For, when they convert to aluminum, the kettle department's production usually increases. This faster production is possible because aluminum spreads heat quickly and evenly *right to the top edge of the kettle.* Consequently, foods cook faster. And because the heat is spread so evenly, they cook better; scorching and burning are practically eliminated.

Moreover, every Wear-Ever Steam Jacketed Kettle—like all Wear-Ever food plant equipment—is made of an extra tough, extra hard aluminum alloy. Wear-Ever kettles have set amazing records for 20 to 30 years of continuous service—records which kettles made of the new hard alloy are sure to surpass some day.

For details on Wear-Ever's complete line of food plant equipment, see your Wear-Ever representative or mail the coupon below.

*Mr. Ezra S. Clemens
Hatfield Packing Co., Hatfield, Pa.

WEAR·EVER ALUMINUM EQUIPMENT FOR FOOD PLANTS



WEAR·EVER Aluminum

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT. OFF.

Standard of Quality for more than 30 years

The Aluminum Cooking Utensil Company
303 Wear-Ever Building, New Kensington, Pa.

Please send me full details about your line of sanitary, hard-alloy aluminum kettles and other food plant equipment.

NAME.....

ADDRESS.....

Fill in, clip to your letterhead, and mail

CUT COSTS
FOOD DISTRIBUTION
in METROPOLITAN NEW YORK

Use Lehigh deep-water docks for water-borne rates to New York-New Jersey

Six warehouses, covering city and suburbs, give spot-stock service to all areas

Scheduled deliveries by Lehigh in 50-mile radius for efficient distribution

Main-line rail connections with all carriers. Mechanized handling cuts unit costs

Write, wire or phone for Lehigh's complete cost analysis of savings on food products, warehousing and distribution in the New York City area

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Stanzoils®

NW-41 white DuPont neoprene, 12" length, heavy weight. For heavier jobs of food processing.

It pays you to buy gloves that permit fast and easy work, with protection. No one or two gloves fit all jobs. There's more production in the right glove for each job. PIONEER'S new Stanzoil catalog shows you how to buy. *Unbiased advice—Stanzoils include all kinds of liquidtight gloves:* all-neoprene, neoprene and vinyl-coated. 32 styles, weights, sizes, colors. Get dexterity plus utmost protection. Increase production, avoid work stoppage, satisfy workers—write for your Stanzoil catalog today!

Industrial Products Division
The PIONEER Rubber Co.
642 Tiffin Rd., Willard, Ohio

STANZOIL PIONEER

Over 30 Years of Quality Glove Making

metso cleans greasy floors faster

ask for free metso sample

Rapid-working Metso Cleaner gets to the bottom of grease and oil. On concrete it removes the dirt from the small pores so that later clean-ups are easier.

Metso Cleaners are conveniently packed in 100 lb. bags or 300 lb. fibre drums.

Philadelphia Quartz Company
1148 Public Ledger Bldg., Phila. 6, Pa.

METSO

metso *cleaners*

eral business staying good; (2) corporate taxes remaining at 52 percent, but the excess profits tax repealed.

True, developments affecting the national economy could make things better or worse than now calculated. If profits drop more than expected, a number of company projects won't be realized. On the other hand, if we get a tax cut, companies may be figured to spend a lot more.

Effect of the materials pinch is evident. Food companies say they would spend much more in '52 if the needed supplies and equipment were available.

Status of Food Branches

Of course, the weights in the individual product branches vary from year to year. In the 1952 estimate, confectionery, baking, and beverages are seen prominent in holding up the total. Canning, however, is gaged as spending some 17 percent less than last year, and dairy products 21 percent less. In the '53-'55 range, beverages, confectionery, and the "general" (many-product) companies are expected to be strongest.

The picture of capital spending is further filled out by specific details spotlighted in the special McGraw-Hill study. It is brought out that some 89 percent of the food companies are financing their 1952 projects entirely out of profits and reserves, with but 11 percent borrowing part of the funds.

Then for the 1953-'55 programs, 91 percent plan to finance fully from profits and reserves. Here, however, the other 9 percent of companies are indicated as proposing to sell stock to raise a portion of the money needed.

A pertinent question, of course, is: How soon must the new equipment pay off? In the food field, 12 percent of the companies gaged the pay-off period for their new units and facilities at 2 years or less; 28 percent put it at 3 years or less; 48 percent at 5 years or less; and the largest number—84 percent—judged the period at 10 years or less.

And how do our food companies rate on the score of laying plans several years in advance? Better than average—for whereas 61 percent of all manufacturing companies reporting in the survey declared they planned well ahead, fully 68 percent of the food concerns reported such advanced planning.

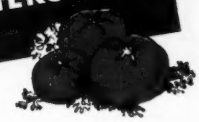
Of these food companies that plan, all are ranging their capital expenditures at least 1 year ahead; 81 percent more than 2 years ahead; 38 percent more than 4 years; and 6 percent more than 5 years in advance.

End (Resume reading on page 67)

for Efficient Handling of Juices and Pulps

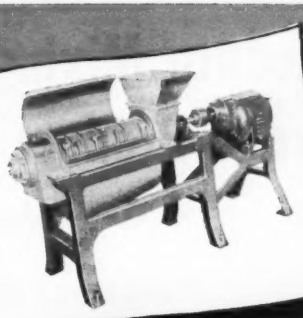
fmc

- EXTRACTORS
- PULPERS
- FINISHERS

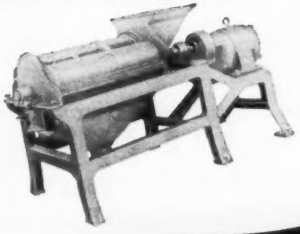


Pulping and juicing operations for tomatoes and a host of other fruits and vegetables are made more efficient, sanitary and economical with this expertly engineered FMC equipment. Many new exclusive features and refinements provide for easier cleaning and highest quality results with a minimum of waste. From a broad range of sizes and types of extractors, pulpers and finishers, you can select the units that will meet exactly the particular requirements of your processing line.

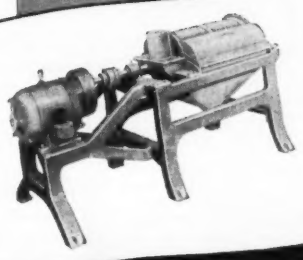
Write for full information or call your nearest FMC representative.



FMC JUICE EXTRACTORS are designed expressly to squeeze juice from fruits and vegetables. Extra long screw provides for drainage of the last possible drops of pure juice.



FMC PULPERS employ whirling paddles within a cylindrical screen to separate pulp from other parts of the product. Ruggedly constructed paddles and screens permit thorough separation at very high capacities.



FMC FINISHERS take pulp from the Pulper, thoroughly and efficiently remove seeds, stems and skins. Adjustable pitch paddles and tension controlled discharge gate permit finishing pulps to varying degrees of dryness.

First in Diversified Food Equipment

FOOD MACHINERY AND CHEMICAL CORPORATION

Canning Machinery Division

General Sales Offices:

WESTERN: SAN JOSE 6, CALIFORNIA **EASTERN:** HOOPESTON, ILLINOIS

Reduce Mixing Time... Improve Product Quality...

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Write for latest descriptive Bulletin.
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Food Chemistry

Finds Invaluable the New SNELL MONTHLY CHEMICAL MARKET REPORTS

Here is the up-to-the minute, authoritative compilation on old and new chemicals and basic raw ingredients, including glycerine and substitute fatty ingredients.

Only $15.00 per month; initial monthly subscriptions invited.

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For Full Details

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CHEMISTS · ENGINEERS
29 WEST 15TH ST. NEW YORK 11, N.Y. WA. 4-8800

after you've read this magazine

. . . and clipped pertinent ideas, articles and advertisements for reference, *please do not burn or throw it away.*

Here are two sound reasons why:

1) Wastepaper can help to swell the funds of your local Boy Scout Troop, your church or other community organization. It gets a good price these days.

2) Whether in magazine form or not, wastepaper helps to fill the increasing need for paper pulp brought on by the mobilization effort.

Collect it. Give it to your favorite organization. Chances are they have scheduled pickups.

Carry-Home Pays Way

—Continued from page 41

years ago are still standing up after well over 50 round trips.

Since the initial cost of a kraft fiber unit is roughly one-half that of wood and its active life almost as long, savings here have been considerable.

At present, "Family Packs" are shipped to the plant in a space-saving, knocked-down condition and assembled as needed with the aid of a steel stitching machine. Arrangements are also being made to have a bottle manufacturer assemble and ship them to the plant with new bottles.

Handling Savings Hailed

While this 24-bottle pack was primarily designed for the consumer, its obvious ruggedness and the in-plant advantages have suggested its increasing use as a standard package in storage and distribution. Since the company operates 9 bottling plants and 55 warehouses, there have been notable savings in handling and space.

As a matter of fact, the lightweight pack has pointed up many palletizing advantages that are enabling Seven-Up Iowa to economically reduce many of its manual operations.

One result is a gradual replacement of deck-type trucks with pallet-loading ones. The latter hold 336 cases and can be loaded in a matter of minutes with a motorized fork truck.

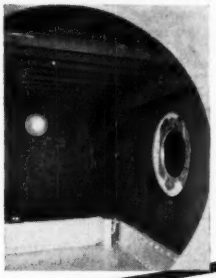
Pallet loading trucks are a direct outgrowth of the "Family Pack" installation. They were designed to carry eight pallet loads. The Hesse Carriage Co. of Kansas City fabricated the ones used at Seven-Up Iowa.

Actually, the pallet-trucking technic has eliminated twelve tedious and time-consuming manual operations in the round-trip of a case. Now, the only hand operations are in loading and unloading the pallet in plant and store. Intermediate warehousing is all done mechanically with work trucks and involves no case movement.

Another benefit of palletized handling—and one which probably has much to do with the longevity of paperboard cases—is the minimum of rough treatment that it gives the product. Broken bottles and "popped" caps have materially decreased.

Even though the company has made no effort to commercialize its idea of a paperboard case-size consumer pack over 25 non-affiliated bottlers have already taken up the idea. In addition, the parent Seven-up Co. in St. Louis has recently adopted "Family Pack" as standard and is pushing it with the franchise plants.

End *(Resume reading on page 42)*



Looking into well-kept water basin through fan port. Glass part at right and interior lighting permit engineering students to observe break-up and distribution of cooling water.

45 YEARS OLD . . .
THIS C. H. WHEELER COOLING TOWER
Still Works Like New

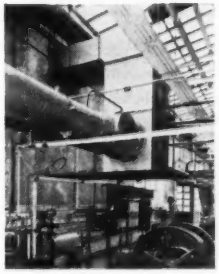
First C. H. Wheeler forced draft tower built in 1906. 4'3"x6'x53'9" high. Metal casing.

At the Towne Scientific School of the historic University of Pennsylvania in Philadelphia a C. H. Wheeler Water Cooling Tower has been in service since 1906. It was the first mechanical draft cooling tower built by the C. H. Wheeler Mfg. Co. and some believe it is the first one built in this country.

In all these years the wood fill has never required replacement. It's still distributing and breaking up cooling water as efficiently as the day it was first put in service. The inside metal casing has never required repairing above the water basin area. Another smaller C. H. Wheeler Cooling Tower has also served this engineering school for several decades. Both are forced draft towers.

These are but two of many C. H. Wheeler towers that have stood for twenty years and more, as testimony to the quality of workmanship and materials that go into every tower we build. Of course, length of service depends on proper care. C. H. Wheeler engineers have prepared a *"Blue print for Operating and Maintaining Mechanical Draft Cooling Towers."* A request on your company letterhead will bring your copy promptly by mail.

FOUNDER MEMBER
C T I
COOLING TOWER INSTITUTE



Another, smaller C. H. Wheeler water cooling tower suspended from beams in another section of the Towne Scientific School.

114

C. H. WHEELER *of Philadelphia*

C. H. WHEELER MANUFACTURING CO., 19th & LEHIGH, PHILADELPHIA 32, PENNA.

Steam Condensers • Centrifugal, Axial and Mixed Flow Pumps • Steam Jet Ejectors • Cooling Towers • Vacuum Refrigeration
High Vacuum Process Equipment • Micro-Particle Reduction Mills • Marine Condensers and Ejectors • Deck Machinery

Let PAYGEL (a wheat starch) help put your foods in the spotlight!

Superior food products at less cost—that's the simple promise made you by General Mills' amazing new PAYGEL wheat starch. PAYGEL is a laboratory controlled, chemically modified starch created by General Mills especially for the food industry.

Here are a few specific examples of the improvement PAYGEL makes in food products:

Salad Dressing: PAYGEL makes possible a 5 to 7% total starch reduction and replaces a blend of starches as an ideal dressing stabilizer. PAYGEL-based dressings retain their initial body without breaking down or thinning out.

Pie Fillings: PAYGEL produces soft cream fillings of excellent body and texture. Reduces tendency to become rubbery or shrink. Having no cereal taste or odor, PAYGEL does not mask flavor.

Soups: Up to 15% less PAYGEL may be used to replace ordinary thickeners in canned soups. Has excellent flavor retention characteristics and remarkable fat dispersion properties.

PAYGEL, a *thick-boiling* starch also gives good results in ice cream cones, caramel confections, dessert mixes, custards, canned specialty foods such as chili, etc. Write, wire or phone for free sample today!

General Mills, Inc.

Special Commodities Division

400 2nd Ave. So. Minneapolis 1, Minn. | 80 Broad St. New York 4, N.Y. | 203 So. LaSalle St. Chicago 4, Illinois

Men & Companies

Paul E. Chandler has been named public relations manager of the Kraft Foods Co.

Industry

Arizona Cheese & Cattle Co. has purchased the H & W Dairy Co. at Scotsdale, Ariz., and has projected a new hard cheese plant to go into operation this month.

Bowman Biscuit Co. will build a new $4,000,000 baking plant in Denver, it is announced by Clinton Bowman, president.

Exchange Lemon Products Co. has started erection of a $200,000 fresh juice department as an adjunct to its plants in Covina, Calif. Production is scheduled for April 1.

General Mills, Inc. announces election of D. H. McVey as vice-president and assistant director of production.

Halter's Pretzels, Inc., has named the following to its board of directors: H. W. Burris, John D. Morgan, George H. France, J. C. Coyle, and John E. Miller.

International Milling Co. has sustained a loss of $100,000 in a fire which swept through its plant at Davenport, Ia.

International Packers Ltd., has been authorized by the Virginia State Corporation Commission to import, export, buy, and sell meats and other packinghouse products. Maximum authorized capital stock: $30,000,000.

LaDelfa Products, Inc., has been founded in Mount Morris, N. Y., for the production of spaghetti and meat balls. Directors are Serafine and Mary L. LaDelfa and Thomas Y. Brent.

Lucerne Milk Co., division of Safeway Stores, Inc., Oakland, Calif., will shortly begin construction of a $450,000 milk plant in Salt Lake City.

Morton Packing Co. reports it expanded its frozen food production facilities in 1951 to the extent of $200,000.

Norris City Milling Co., Norris City, Ill., recently suffered an estimated $50,000 loss in a fire which destroyed its soybean processing plant.

Sebastian-Stuart Fish Co., a salmon cannery and cold storage plant at Tyee, Alaska, has been purchased by the Whiz Fish Products Co. of Seattle.

Smith Frozen Foods of Pendleton, Ore., has acquired the processing, freezing, and storage equipment of the Milton-Freewater frozen foods plant. Purchasing price was reported as more than $400,000.

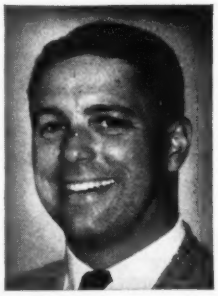
A. E. Staley Mfg. Co., Decatur, Ill., has obtained a loan of $8,000,000 from the Chase National Bank, N. Y., for additional working capital.

Unilever Ltd. is constructing a vegetable-oils plant to be known as Sadiq Vegetable Oils & Allied Industries, Ltd., in Bahawalput State, Pakistan. Approximate cost: $4,200,000.

Personnel

Ernest W. Beck, Jr., has been appointed manager of the Chalmette, La., refinery of American Sugar Refining Co. He succeeds M. D. Scott, who retired due to ill health.

W. J. Biehl has been elected president of International Milk Processors, Inc. He suc-



Donald L. Truax of the California Packing Corp. is new president of the Association of Food Industry Sanitarians.

Votator
HEAT-TRANSFER APPARATUS

Chills or slush-freezes in seconds!

Here's how you can streamline packing operations with fast, continuous processing.

VOTATOR Heat-transfer Apparatus chills juices, purees, etc., or slush-freezes citrus concentrates in just a few seconds. Precise, automatic control saves time and reduces labor requirements.

With the closed-system process, variations are eliminated. Air is excluded . . . thus flavor, vitamin content, and purity are safeguarded.

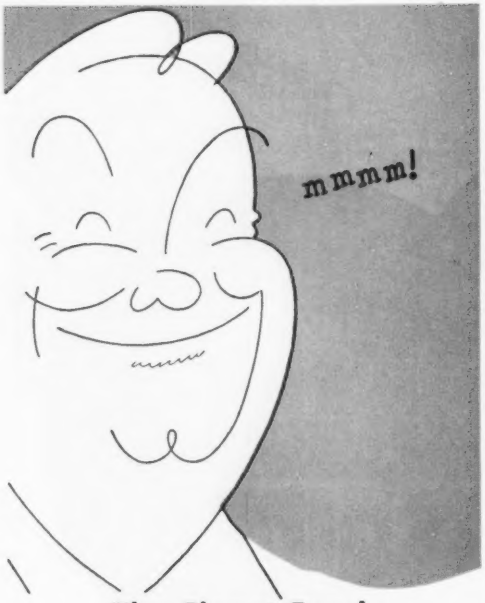
Throughout the food processing field, VOTATOR Heat-transfer Apparatus is used for heating and cooling, sterilizing, plasticizing, emulsifying, crystallizing, quick-freezing and aerating. If you process any liquids or viscous materials, it will pay you to investigate . . . take advantage of Girdler's experience in process engineering, design and construction.

VOTATOR—T.M. Reg. U. S. Pat. Off.

WIDE APPLICATION

FOOD PRODUCTS	FUNCTION OF VOTATOR APPARATUS
Cream Style Corn	Sterilizing and Cooling
Dog Food	Cooking, Sterilizing and Cooling
Chocolate Milk Drink	Sterilizing and Cooling
Edible Starch (For Salad Dressing)	Cooking and Cooling
Pie Filling	Cooking, Pasteurizing and Cooling
Strained Food	Sterilizing and Cooling
Soup	Sterilizing and Cooling
Lard	Chilling and Plasticizing
Margarine	Continuous Manufacture
Shortening	Chilling and Plasticizing
Sweetened Condensed Milk,	Cooling and Crystallizing of Sugars
Invert Syrup	Cooling and Crystallizing of Sugars
Eggs	Pasteurizing and/or Chilling
Concentrates, Fruit Juices and Purees	Slush-Freezing
Juice Concentrates, Enzyme De-Activation,	Sterilization, Cooling

the GIRDLER Corporation
VOTATOR DIVISION



The Finest Foods

Taste Better
Sell Better

when you add a little

Huron MSG

MONOSODIUM GLUTAMATE 99+%

to your present formula

Yes, the finest food products can be made to taste even better and be given new taste appeal and more sales appeal with the addition of Huron MSG.

Huron MSG can be added in small quantities to your present formula and no other changes are necessary. The cost can be kept surprisingly low.

Proof—try it yourself on your own products by simply writing us today for sample quantities. Or our Technical Service Department will be glad to make specific recommendations.

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Factories—Harbor Beach, Michigan

Gen. Sales Offices—9 Park Place, New York City 7
161 East Grand Ave., Chicago 11 • 13 E. 8th St., Cincinnati 2
383 Brannan St., San Francisco 7

Ernest M. Loveland has been elected to the position of vice-president in charge of production of the Seaplant Chemical Corp.

ceeds J. H. Stambaugh, who recently became assistant to the Secretary of Agriculture.

I. C. Bjork, formerly West Coast manager for Best Foods, Inc., and president of Four Seasons, has joined Scudder Foods Products, Inc., of Monterey Park, Calif.

Alfred M. Boyce has been appointed director of the Citrus Experiment Station of the University of California.

James F. Brownlee is now chairman of the board of Minute Maid Corp. He succeeds Alexander Standish, who continues to serve as a director.

George H. Coppers, president of the National Biscuit Co., will head the Commerce & Industry Committee for the 1952 Cancer Crusade scheduled for April.

Donald D. Geoffroy has been elected a vice-president of Pacific Brewing & Malting Co., San Jose, Calif.

William N. Harsha has been named Pacific coast sales manager for the Pet Milk Sales Corp. He succeeds the late E. P. Patterson.

Edward J. Hekman, formerly vice-president of Hekman Biscuit Co., Grand Rapids, Mich., has been elected president and general manager, succeeding his father, the late John Hekman.

James B. Lane has become vice-president in charge of sales for the California Tuna Canning Co., San Diego, Calif.

Herbert F. Lundstrom has been appointed manager of American Can Co.'s new Stockton, Calif., plant.

Joseph Morningstar has relinquished the presidency of Morningstar, Nicol, Inc., of New York and its subsidiary, Paisley Products, Inc., Chicago, to become board chairman. He is succeeded by G. J. Muller.

Fernand P. Morrissette, who has served the baking industry for over 30 years, has been appointed a vice-president of Standard Brands Ltd. of Canada.

H. Romani, vice-president and director of purchases for the biscuit manufacturing firm of Christie, Brown & Co., Ltd., Toronto, has been elected vice-president of the Packaging Assn. of Canada.

William A. Schroeder, Jr., has been elected vice-president in charge of sales for The Best Foods, Inc.

Dr. Byron T. Shaw is now administrator of USDA's Agricultural Research Administration.

J. S. Snelham has been elected chairman of the executive committee of the board of Continental Can Co. of Canada, Ltd., according to H. A. Rapelye, president.

Frank G. Staropoli has purchased the Pepsi-Cola Co. plant of Rochester, N. Y., and is now a Pepsi-Cola franchised bottler. The plant's capacity is over 600,000 cases per year.

Associated Industry

Allis-Chalmers Mfg. Co. has appointed William M. Wallace as assistant to the vice-president of its general machinery division.

Continental Can Co. has begun construction of a new $3,500,000 fiber drum plant near Pittsburg, Calif. This is the company's first such plant west of St. Louis.

Dow Corning Corp. is invest-

J. G. Cherry was recently elected president and operational manager of the Cherry-Burrell Corp.

your best buy in a complete variable speed power plant

here's why:

1 A *complete,* self-contained variable speed power plant combining motor, REEVES speed varying mechanism and speed reducer in one, space-saving unit.

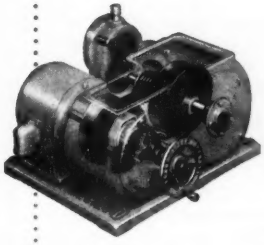
2 Available with any standard, constant-speed, foot-type motor—the same as motors on your other machines—no stocking of special motors.

3 Easily applied to machines in service. Horizontal and vertical models; speed ratios 2:1 through 6:1; sizes 1 to 25 hp; manual or automatic controls. Fractional hp units also available in ratios up to 10:1.

4 REEVES operating principle—proved in 300,000 installations—assures *positive, accurate* speed changes without stopping machine.

For *your* machines, new or old, specify REEVES Speed Control and secure all the benefits of stepless speed adjustability. For full information, send for catalog No. FE64b-G.

Here Is How It Works



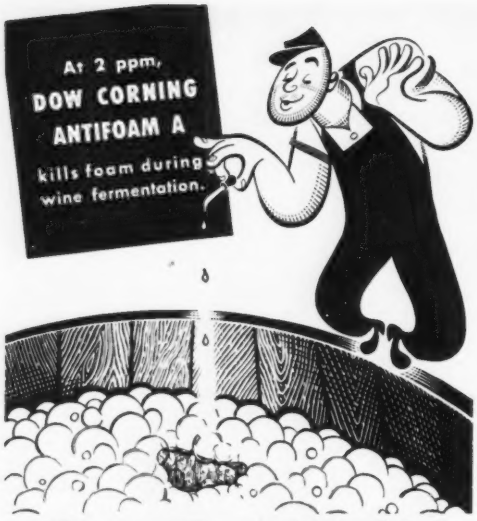
Phantom view of horizontal model with single reducer.

The Motodrive utilizes proved REEVES operating principle of a V-belt driving between two pairs of cone-shaped discs which are adjustable to form an infinite number of driving and driven diameters. Discs are mounted on parallel shafts. One shaft receives power at constant speed from motor—other delivers power at infinitely adjustable speeds to gear reducer from which desired speed is transmitted to driven machine.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA

Recognized leader in the specialized field of speed control engineering

accurate • variable
REEVES *Speed Control*



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DOW CORNING ANTIFOAM A

To get the most out of your process equipment, add a trace of Dow Corning Antifoam A and use the extra space you've been wasting on foam! You'll process most of your most violent foamers, even under vacuum or continuous heat, without waste or hazardous overflow.

That's because Dow Corning Antifoam A kills foam faster and under more varying conditions than any other material known. It is odorless, tasteless and non-toxic; safe to use in food and drugs at concentrations up to 10 parts per million —many times the concentrations normally required to control foams.

Indeed, effective concentrations are so low that Dow Corning Antifoam A is not only the most versatile and efficient defoamer on the market, it is also the most economical.

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Send Coupon Today for Your FREE SAMPLE

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Midland, Michigan

Please send full information and a free sample of Dow Corning Antifoam A.

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DOW CORNING CORPORATION
MIDLAND, MICHIGAN

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Walter I. Fisher is now manager of the Trade Relations Dept. of the Eastern Seaboard Sales Area for Sunshine Biscuits, Inc.

ing $13,000,000 in a major expansion of plant capacity for silicone products. Applications of silicones include the making of Pan Glaze for the baking industry and water repellent finishes for masonry. They are also used for cutting froth losses in wine, syrup, and jam processing.

Robert Gair Co., Inc., reports it has begun operation of its new shipping container plant at Teterboro, N. J.

International Paper Co. announces election of William J. Murray, Jr., to its board. He fills the vacancy created by the death of Albert H. Wiggin.

Marvel-Schebler Products Div., Borg-Warner Corp., has named Fred H. Kroeger as sales manager in charge of power brakes and devices.

Mohlman & Reis, Inc., has been formed as a consultative body on automatic packaging machinery. Consultants are George A. Mohlman, formerly of Package Machinery Co., and Joseph F. Reis, president of Reis Associates.

Olin Industries, Inc., announces appointment of F. S. Elfred as executive vice-president, B. E. Bassett as vice-president for production, and M. W. Acker as vice-president.

Paisley Products, Inc., Chicago, has purchased the plant, equipment, formulas, and manufacturing processes of the Layton Elastic Glue Co.

Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, Ohio, has appointed Karl H. Dressel as field engineer. The company produces industrial belting, hose, and other rubber products.

Rheem Mfg. Co., manufacturer of steel shipping containers and automatic storage water heaters, has elected Robert P. Williams, Jr., and Clarence Graham, Sr., as vice-presidents.

Deaths

Lewis Croxton, manager of western district for National Biscuit Co.—Dec. 31.

Raymond C. Gaugler, 59, president of American Cyanamid Co.—Of a cerebral hemorrhage, Jan. 11.

Clifford W. Gaylord, 68, president of Gaylord Container Corp.—After a long illness, Jan. 7.

H. Hiter Harris, 58, member of board of General Baking Corp.—Of a heart attack, Jan. 13.

J. R. Johnson, 66, founder and president of Statesville Orange Crush Bottling Co., Statesville, N. C.—After five weeks illness, Jan. 17.

Harold R. King, 53, president of Prentiss Drug & Chemical Co., Inc.—Of a heart attack, Jan. 28.

Vinton Hunt Matthews, 56, vice-president of Food Machinery & Chemical Corp. and manager of its John Bean Western Div., San Jose, Calif. —Nov. 29.

Patrick J. McKenney, 64, vice-president of Pillsbury Mills—Of a heart attack, Dec. 30.

William G. Shanks, 54, board member of National Dairy Council and assistant director of public relations, Kraft Foods Co., Chicago—After a short illness, Jan. 10.

Jason Whitney, 73, chairman of the board of Blue Moon Foods, Inc., and June Dairy Products Co., Inc.—Dec. 15.

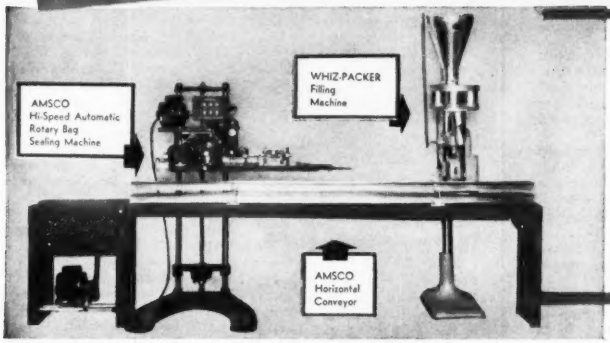
Clyde H. Shaffer, president of Breyer Ice Cream Co. and Hydrox Ice Cream Co., has been elected to the board of National Dairy Products Corp., the parent company. (Bachrach photo)

making a quality product is *your* business packaging it economically is *our* business!

THAT IS WHY ARNOLD BAKERS, INC. USES

AMSCO

PACKAGING EQUIPMENT



SIMPLEX High Speed
Automatic Bag Making Machine

Bag packaging features to meet special requirements. 3 illustrations are shown below.

If you are interested in reducing the cost of your bag packaging, an AMSCO engineer will show you how. We can supply cost-saving equipment for every operation, starting from the roll stock to the finished product . . . bag making, bag filling, bag conveying, bag sealing . . . individual units available for each operation or complete bag packaging set-ups.

Choose AMSCO to package your product in cellophane, maralux, diafane, foil, pliofilm, polyethylene or any other heat sealable material . . . printed or unprinted. Savings in labor and increased production pay for your AMSCO equipment in a comparatively short time. Contact AMSCO today! Write Dept. FE-3 for complete catalog.

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Specialists in Diversified Packaging Equipment.

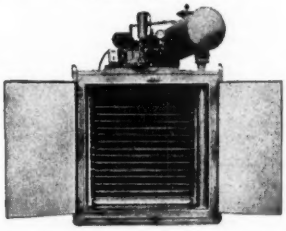
FREEZE FASTER AND MORE EFFICIENTLY

with

Amerio CONTACT PLATE FREEZERS

(Patent Applied For)

No Shrinkage
Complete Consumer Satisfaction
Flat Uniform Packages
Minimum Freezing Time
Maximum Freezing Area
Minimum of Floor Space



Continuous Operation
Full Flavor & Quality Retention
Continuous High Production
Wide Flexibility of Products
Simplicity of Operation
Reduced Cleaning Time

Model B 15 Stations Full Flooded Ammonia Type Ready for Loading

ECONOMY—LOWER POWER CONSUMPTION PER POUND OF PRODUCT
ANNUAL MAINTENANCE COSTS ARE PRACTICALLY ZERO

Top and Bottom Contacts
Assure Uniform Product Excellency

When You Freeze with Amerio You Know It's Right

Designed For
Ammonia, Brine or Freon
Refrigerant

Amerio
Contact Plate Freezers Inc.
Union City, N. J.
"It's the Contacts that Count"

Send For
New, Illustrated
Brochure

CAN Seakem* "Colloids Out of the Sea" IMPROVE YOUR FOOD PRODUCT?

Typical Food Items SeaKem Products Can Help Improve

- Aspics
- Beer
- Beverages
- Cake Icings
- Canned Fish and Meat
- Canned Fruit
- Canned Poultry
- Catsup (Imitation)
- Cheese Spreads
- Chocolate Milk
- Chocolate Syrups
- Confectionery
- Dehydrated Soups
- Dessert Mixes
- Flavoring Emulsions
- French Dressing
- Frozen Fish
- Frozen Fresh Fruit
- Frozen Fruit Juices
- Fruit Fillings (Pie)
- Fruit Juices
- Fruit Syrups
- Glazes
- Ice Cream
- Marshmallow Toppings
- Meringues
- Milk Puddings
- Pet Foods
- Pie Fillings
- Pie Mix (Prepared)
- Pumpkin Pie Mix
- Ripple Ice Cream
- Salad Dressings
- Sausages
- Sauces (Prepared)
- Sherbets
- Soluble Coffee
- Syrups
- Tomato Juice
- Water Gel Desserts
- Whipped Cream

Recent application developments are fast making it apparent that SeaKem "Colloids Out of the Sea" offer countless new opportunities for improving a wide variety of food items (see typical list on left).

In addition to being employed profitably for scores of gelling, binding, bodying, thickening, suspending and stabilizing purposes, SeaKem Products are now being used to improve mouth-feel and flavor . . . increase the efficiency of component ingredients . . . and achieve unique end-product advantages.

Also of growing interest are such developments as the use of SeaKem Products to protect frozen foods from oxidation . . . modify ice-crystal growth in fruits . . . custardize milk and products containing milk solids . . . create thermally-reversible gels . . . and precipitate proteins in processing.

If you are not up to date on how SeaKem "Colloids Out of the Sea" can help improve your food product, your inquiry for the latest Seakem Technical Bulletins is invited. Write today, mentioning the type products and problems with which you are concerned.

FREE SAMPLES FOR YOUR APPRAISAL

Working samples of SeaKem Products for your own laboratory investigation will be gladly supplied on request. Or if you prefer, SEAPLANT Chemical Corporation's Laboratory (where a continuous research program on colloid agents is carried on) will undertake to develop specific recommendations for you — *in complete confidence and without obligation or cost.* Write today.

* SeaKem is the trademark for the standardized, water-soluble, sea plant extractives manufactured by the SEAPLANT Chemical Corporation. Refined by rigidly controlled processes which insure dependable uniformity and purity, SeaKem "Colloids Out of the Sea" are light amber to colorless, free-flowing flaky powders. Odor and flavor are extremely slight or entirely absent. Available in a variety of types suitable for use in an unusually wide range of applications, SeaKem Products have won acceptance on the basis of proven advantages with many of this country's leading food manufacturers and processors.

SEAPLANT CHEMICAL CORPORATION
SERVING INDUSTRY WITH "COLLOIDS OUT OF THE SEA"
63 David Street, New Bedford, Massachusetts

Recent Inventions

Cheese Curd Obtained From Milk Solids Suspended in Serum by Dispersing Solids, Adding Starter to Coagulate Curd, Centrifuging at High Speed, and Impacting Discharging Curds by Sudden Changes in Velocity—*G. J. Strezynski, Poughkeepsie, N. Y. to De Laval Separator Co., New York.* No. 2,574,508. Nov. 13, 1951.

Bread Dough Finishing Machine With Horizontal Pan Conveying System and Laterally Deposed Slicing Element Which Engages Dough in Pan—*C. J. Gareis, to United Bakers, Inc., Forty Fort, Pa.* No. 2,574,636. Nov. 13, 1951.

Rotary Beater Mill and Classifier for Producing Sieve Range Sized Chocolate Products—*J. J. Alikonis, to Paul F. Beich Co., Bloomington, Ill.* No. 2,574, 948. Nov. 13, 1951.

Baking Oven Having Plurality of Infra-Red Burners, Each Including a Refractory Body for Producing Rays Which are Directed Towards the Bread in Transit, and Including Ducts and Means for Forced Air Circulation Over Refractory Bodies—*W. E. Owen, Hamilton, Ontario, Canada.* No. 2,575,291. Nov. 13, 1951.

Process and Apparatus for Stuffing Sausage in Helically Wound Casing With Sealed Overlapped Edges and Means for Intermittent Link Formation—*F. H. Reichel and C. L. Harder, Fredericksburg, Va., to American Viscose Corp., Wilmington, Del.* No. 2,575,467. Nov. 20, 1951.

Gelatin and Glue From Skin Shreds by Passing Them Countercurrent to Hot Aqueous Agent to Hydrolyze the Collagen and Extracting in an Elongated Zone With Gradient of Rising and Falling Pressures—*R. E. A. J. Frechin, Darnac, France.* No. 2,575,551. Nov. 20, 1951.

Eggs Hard Boiled and Shelled by Machine With Power-Moved Tray for Immersing in Cooking Tank—*R. A. Williams, Sr., Johnson City, N. Y.* No. 2,575,608. Nov. 20, 1951.

Multiple Compartment Bottle Carrier Made From Single Piece of Paperboard—*R. H. Casler, to R. S. Sanford, Oakville, Conn.* No. 2,575,654. Nov. 20, 1951.

Method of Preserving Milk by Adding Small Amount of Water-Soluble Chlorite of Non-Toxic Cation—*J. D. McMahon, Niagara Falls, N. Y. to Mathieson Chemical Corp.* No. 2,575,670. Nov. 20, 1951.

Flabby, Moldable Food Products of Variable Sizes and Weights Packed by Compacting and Compressing Into Substantially Uniform Cylindrical Masses—*E. H. Carruthers, Warrenton, Ore.* No. 2,575,703. Nov. 20, 1951.

Method of Aseptic Canning in Metal Containers Having Small Filling Opening, Comprising Water and Converting This to Steam to Force out Air, Steam Sterilizing Can Externally, Filling With Sterile Food Under Sterile Atmosphere and Sealing—*L. E. Clifcorn, Elmhurst, Ill., to Continental Can Co., Inc., New York.* No. 2,575,863. Nov. 20, 1951.

Milk Temperature Conditioning Vessel With Heating and Cooling Coils in Jacket, the Milk Overflowing From Central Vessel and Passing in a Film Over Conditioning Coils to Outlet—*M. A. Soden, Annaheim, Calif.* No. 2,576,050. Nov. 20, 1951.

Chocolate Molding With Reservoir-Fed Distributing Device Supplying Product to Plurality of Spring Valves—*S. E. Vingerling, Rotterdam, Netherlands, to Vingerling's Machinefabriek N. V., Rotterdam.* No. 2,576,054. Nov. 20, 1951.

Doughnut-Cooking Machine With Frame Containing Rotating Auger Elements Suspended in Hot Fat to Propel Doughnuts—*H. N. Irvine and K. L. Magee, Burlington, Ia.* No. 2,576,183. Nov. 27, 1951.

Fish Cutting Machine With Conveyor, Engaging Members and Pair of Laterally-Spaced Rotating Knives—*M. K. Kuther, Monterey, Calif.* No. 2,576,301. Nov. 27, 1951.

Machine for Placing Biscuits on Flights of Continuously Moving Conveyor—*J. W. Smith, to Battle Creek Bread Wrapping Co., Battle Creek, Mich.* No. 2,576,366. Nov. 27, 1951.

Cooky-Cutting Machine With Rotating Rollers to Clean Knife—*C. L. Ott, to Baker Perkins, Inc., Saginaw, Mich.* No. 2,576,533. Nov. 27, 1951.

Dehydrating Soft Cheese by Quick Freezing and Reducing Water Content Below 2 Percent Without Migration of Whey From Interior to Surface—*L. Gootgeld, Escondido, Calif.* No. 2,576,597. Nov. 27, 1951.

Dough Fed and Sheeted Continuously by Joining Small Masses on Moving Conveyor While Turning Dough Laterally on Itself—*M. Cohen, to Interstate Bakeries Corp., Kansas City, Mo.* No. 2,576,670. Nov. 27, 1951.

Methods of Producing Vanillin From Lignosulfonic Compounds in Aqueous Medium—*J. H. Fisher,*

YOU CAN NEATLY **PACKAGE 2 UNITS PER SECOND!**

...On this Modern
HIGH SPEED WRAPPER

FOR THE ARMED SERVICES
We are contributing to the nation's defense program by providing a large part of our increased production facilities for building precision armaments. Civilian orders are filled on a reasonable time basis only.

Write for illustrated brochure.

Wraps single or multiple units per package with equal ease and speed — no matter how irregular the shape — how fragile the product.

Your production increases rapidly with the Campbell Wrapper. Dependent upon the product, this amazing machine wraps from 80 to 150 units per minute — *with some users reporting as high as 180!* Highly important, too, it produces a neat, square-cornered package with irresistible sales appeal . . . Labels are accurately spotted and product is not crushed, broken or dented — because it is "float wrapped". In most cases, only one operator to feed and one to pack are required. Machine uses wrap materials of all types, such as glassines, cellophanes, foils, etc., for use with or without stiffeners, as desired. It comes with Straight, L or Hopper type feed.

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WRAPPER
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Manufacturers of Aniline and Gravure Presses, Folders, Interfolders, Laminators, Waxers, Embossers, Slitters, Sheeters, Roll Winders, Packaging Machines, Crepers and Tissue Converting Units.

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1. Analysis of sanitation problems, whether recognized or unrecognized.
2. Development of plan for solution based on:
   a. Degree of sanitation desirable b. Budget limitations
   c. Methods applicable to situation
3. Inspectional program.
4. Advice on practical problems resulting from activities of Food and Drug and other regulatory bodies.
5. Appraisal and advice on pest control programs.

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Executive Director

HERMAN L. FELLTON
Vice-President

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Industrial Fumigation
Plant Pathology
With industrial and regulatory experience

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INSTITUTE OF INDUSTRIAL SANITATION

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Oven cooks ton of cookies an hour on 150 TIMKEN® bearings

A TON of cookies or crackers per hour!

That's the production capacity of this continuous conveyor electric oven now installed in Chile. Built by Washington Industrial Products Inc., the oven is 165 feet long, has temperatures as high as 600° and is equipped with 150 Timken® tapered roller bearings on the conveyor rollers. These Timken bearings, mounted in Timken bored seat steel tubing, withstand the high temperatures, need little maintenance and insure free-running rollers.

Friction is practically eliminated because of the true rolling motion and incredibly smooth surface finish of Timken bearings. Conveyor rollers are held in proper alignment, wear on belt and rollers is reduced.

Over 50 years of bearing research and development have made Timken bearings number one in industry. No other bearing can offer all the advantages of Timken bearings. Specify them for the machinery you build and the machinery you buy. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, O. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

WASHINGTON INDUSTRIAL PRODUCTS INC. mounts conveyor rollers of its 165-foot long cookie oven on Timken tapered roller bearings. Timken bearings make friction practically negligible, reduce wear. Shown above is a typical conveyor roller application of Timken bearings using the new bored seat tubing assembly.

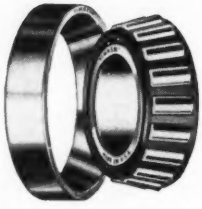
FINISHED TO CLOSER TOLERANCES

Finishing to incredible smoothness accounts for much of the precise, smooth rolling performance of Timken bearings. This honing operation is typical of the amazingly accurate manufacturing methods at the Timken Company.

The Timken Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST ⊣◫⊢ LOADS OR ANY COMBINATION ◫

St. Catherines, Ontario and H. B. Marshall, Toronto, to The Ontario Paper Co. Ltd., Thorold, Ontario. Nos. 2,576,752, 2,576,753, 2,576,754. Nov. 27, 1951.

Variegated Ice Cream Made Continuously by Introducing Molten Flavoring Material Into Moving Stream of Chilled Mix Prior to Freezing—E. C. Lehner, to Swift & Co., Chicago. No. 2,576,842. Nov. 27, 1951.

Sterilizing Foods by High Frequency Electromagnetic Waves That do not Heat Food but Destroy Microorganisms — K. A. Smith, Burbank and A. L. Grinnell, Los Angeles, Calif., to Electronic Chemical Engineering Co., Los Angeles. No. 2,576,862. Nov. 27, 1951.

Method of Preserving Fresh Apples by Separating Layers With Moisture-Absorbent Paper Impregnated With Salt and Honey Treated With Carbon—A. J. Borck, Canon City, Colo. No. 2,576,919. Dec. 4, 1951.

Method and Apparatus for Smoking and Tenderizing Meat Products Consisting of a Unit House With External Smoke Generator and Controlled Means for Heating—C. E. Dillon, Kansas City, Mo., to R. H. Starr, Kansas City, Mo. No. 2,576,925. Dec. 4, 1951.

Process of Refining Animal and Vegetable Oils Without Loss of Glycerides by Mixing Aqueous Refining Agent With Oil-in-Solvent, Centrifuging off Precipitated Impurities—M. Mattikow, New York City. Nos. 2,576,957 and 58. Dec. 4, 1951.

Continuous Confectionery Mix Freezer Consisting of a Cylindrical Chamber With Internal Rotating Shaft Containing Reciprocally Mounted Spirally Curved Scraper Elements—T. Carvel, Hartsdale, N. Y. No. 2,576,995. Dec. 4, 1951.

Onion Halving Machine Having Continuous Conveyor That Positions Root-Stem Axis at Right Angles to a Row of Spaced Cutting Blades—R. M. Magnuson, Campbell, Calif., to Basic Vegetable Products Co., Vacaville, Calif. No. 2,577,086. Dec. 4, 1951.

Device for Extracting Sugar From Beet Slices Comprising Tower With Hollow Center Column Containing Rotatable Flexible Screw Which Moves Beets Countercurrent to Flow of Extracting Liquid —E. Langen, Elsdorf, Germany, to Pfeifer und Langen, Elsdorf Rheinland, Germany. No. 2,577,135. Dec. 4, 1951.

Producing Dry-Pack Processed Pickle by Encasing in Sheath of Nontoxic, Water-Impervious Waxy Material—M. M. Scharf, Bellwood, Ill. No. 2,577,211. Dec. 4, 1951.

Raising Dough Temperatures Uniformly by Holding at Low Temperature and Starting all Batches in Series off Into Fermentation at a Desired Temperature—R. N. Winfree, Omaha. No. 2,577,220. Dec. 4, 1951.

Degreening Citrus Fruit by Treatment With Ethylene Oxide, Trichloroethane and Ethylene Dichloride at 75-90 deg. F. and 80-100 Percent Humidity—H. J. Keller, Dunedin, Fla. No. 2,577,421. Dec. 4, 1951.

Confection Coating Machine Consisting of Two Concentric, Independently Rotating Drums, the External Applying Coating, the Internal Supporting Confections—J. F. Robb, Cleveland Heights, Ohio, to Good Humor Corp., Brooklyn, N. Y. No. 2,577,433. Dec. 4, 1951.

Combined Pitting and Slicing Machine for Cherries and Like Fruits —W. W. Kelly, Portland, Ore., to Food Machinery & Chemical Corp., San Jose, Calif. No. 2,577,527. Dec. 4, 1951.

Method of Filleting Fish by a Cut Commencing at the Tail End and Progressing Towards the Head on the Dorsal Side After Incising Past the Backbone Between Tail and Belly on the Ventral Side—W. H. Hunt, National City, Calif., to Fish Machinery Corp., Boston. No. 2,577,686. Dec. 4, 1951.

Process for Drying Plums and Grapes Which Reconstitute to Substantially Fresh Fruit by Sectioning, Dusting With Ascorbic Acid, Freezing and Removing Water by High Vacuum—E. W. Flosdorf, Forest Grove, Pa., to Tabor-Olney Corp., Baltimore. No. 2,577,704. Dec. 4, 1951.

Dough Shaping, Treating and Filling Device That Cuts Dough Sheet Into Four Laterally Adjacent Strips and Automatically Laps Them to Form Double Strips—V. E. Sternbach, Bronx, N. Y. No. 2,577,925. Dec. 11. 1951.

Apparatus for Continuously Measuring Density of Flowing Flour, Meal and Like By Measurement of Deflection of a Lever-Suspended-Bob in the Test Stream—P. J. Wood, Danville, Ill. No. 2,578,118. Dec. 11, 1951.

Food Processing Apparatus Which Combines Time and Temperature Control of Blanching in Pressure-Tight Chamber—F. B. Doyle, Trenton, N. J., to Ingersol-Rand Co., New York City. No. 2,578,179. Dec. 11, 1951.

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Heat Exchangers

Attractive 13-page bulletin contains descriptions of cubic heat exchangers. Cited are exchanger's advantages in construction, and there is sizing information, and a table of corrosive materials which may be handled by these units.—*British-American Carbon Corp., 18 E. 48th St., New York 17.*

Circle L233B on Reader Service Card

Coils

Standard and non-freeze type steam and hot water coils are subject of Bulletin DS-385. Outlined are capacities, performance, installation, dimensional data, and points on selection. 66 pages.—*The Trane Co., La Crosse, Wis.*

Circle L233C on Reader Service Card

Water Conditioners

Pamphlet of 4 pages offers detailed picture of water conditioning equipment. Types included are chemical feeders, degasifiers, demineralizers, feed-water heaters, sodium cation units, etc.—*Penfield Mfg. Co., 19 High School Ave., Meriden, Conn.*

Circle L233D on Reader Service Card

Motors and Turbines

Data on centrifugal motors and turbine generators, with accompanying nomenclature, are presented in Catalog 5517. Particular use in relation to cane and sugar refining is cited. 11 pages.—*General Electric Co., Schenectady, New York.*

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"Package" Pumps

Available in four types—(1) open and (2) closed impeller close-coupled, (3) pedestal-mounted, and (4) open impeller vertical mounted type—new "package" pumps have capacities to 80 gpm. at heads to 100 ft. Operation is said to be quiet. Dimensional data plus performance curves are given. Bulletin 52B7529 of 6-fold-out pages.—*Allis-Chalmers Mfg. Co., General Machinery Div., Milwaukee 1.*

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Gas and Oil Burners

Pointing to advantages of five models of gas and combination oil and gas burners, Bulletin AD-101 also describes forced air draft system and electronic control features. Gas and oil is said to burn completely without induced secondary air. 4 pages.—*Cleaver-Brooks Co., Hev-E Oil Burner Div., 326 E. Keefe Ave., Milwaukee 12.*

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General Purpose Pumps

Construction details on grease-lubricated pedestal-mounted general purpose pumps are given in Bulletin 52B6351B of 6 pages. Available in capacities to 2,500 gpm at heads to 550 ft., pumps can be obtained with stuffing box or mechanical seal, and direct coupling or V-belt drive. There is a choice of materials.—*Allis-Chalmers Mfg. Co., 1113 S. 70th St., Milwaukee 1.*

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Air Compressor

Saving of starting current by arrangement for two motors to start independently is reported advantage of Model 100 air compressor described by manufacturer in broadside. Numerous additional features are discussed.—*Beeson-Reichert, Inc., Toledo 4.*

Circle L233I on Reader Service Card

Blow-Off Valves

Surface blow, bottom blow-off, and water-column blow-off valves and connections are presented in catalog.—*Everlasting Valve Co., 49 Fisk St., Jersey City 5, N. J.*

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Steel Boilers

Illustrated 4-page folder discusses steel boiler units for heating, power, or process steam. Example is boiler rated to produce approximately 2,500,000 Btu. hourly.—*Kewanee Boiler Corp., Kewanee, Ill.*

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Packaging Equipment

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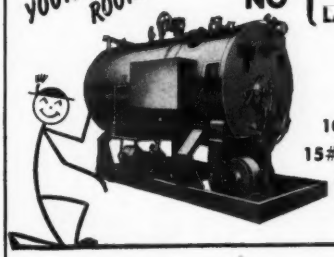

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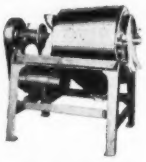

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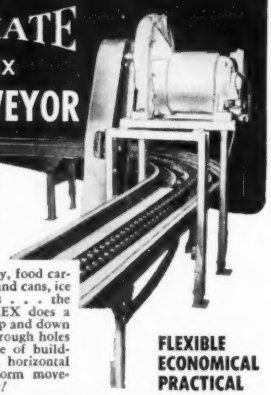

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phlet of 4 pages discusses variety of packaging instruments and their application.—*Package Machinery Co., Springfield, Mass.*

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Dust Collector

Well-styled catalog of 28 pages sets forth data on dust, its collection, and utilization. Reader is taken through steps of determining particular dust problems, choosing equipment, and solving special requirements. Catalog 101. —*Buell Engineering Co., Inc., 70 Pine St., New York 5.*

Circle L235A on Reader Service Card

Control Equipment

Microscopes

Printed in limited quantity, booklet *The Theory of the Microscope* explains non-mathematically how a microscope works. Notes are also given on objectives, eyepieces, condensers, filters, and conditions effecting performance. 24 pages.—*Bausch & Lomb Optical Co., Bureau of Education, Rochester 2, N. Y.*

Circle L235B on Reader Service Card

Reagents and Chemicals

More than 1,000 chemicals, plus data on grades, strengths, and impurities, are covered in 264-page catalog. Useful to laboratory chemist is section dealing with storage and handling of chemicals requiring extra care.—*Baker & Adamson Products, General Chemical Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6.*

Circle L235C on Reader Service Card

Laboratory Equipment

Complete instrument line for laboratories is given in 19-page issue of Waco *Catalyst*, Volume 9F1. Facts on titrators, spectrophotometers, pH meters, and accessories are included. — *Wilkins-Anderson Co., 4525 W. Division St., Chicago.*

Circle L235D on Reader Service Card

X-Ray Instruments

New 60-page catalog, titled *X-Ray Diffraction and Geiger-Counter X-Ray Spectrometric Equipment*, offers material on diffraction, spectrometry, and fluorescence analysis. Components such as wide-range goniometers, Geiger tubes, electronic circuit panels, Weissenberg and Geiger counter Weissenberg cameras, crystal analysis equipment, etc., are discussed.—*North American Philips Co., Inc., Research & Control Instruments Div., 750 S. Fulton Ave., Mount Vernon, N. Y.*

Circle L235E on Reader Service Card

Heat Control Unit

Construction and operation of unit that anticipates weather changes, then adjusts heat input accordingly, are treated in 4-page bulletin. Text shows how to install and adjust without difficulty. —*Automatic Devices Co., Inc., Western Springs, Ill.*

Circle L235F on Reader Service Card

Flow Meters

Information on types of meter bodies, operating principles, primary devices for flow measurement, recording charts, and accessories, constitute theme of Bulletin F1605. Flow meter instruments for recording, integrating, indicating, automatic controlling, and telemetering flow of steam, water, air, gas, oil, solutions, and other fluids, are shown. 40 pages.—*The Bristol Co., Waterbury 20, Conn.*

Circle L235G on Reader Service Card

Industrial Scales

Indexed catalog of 128 pages illustrates principal types of scales for use in industry. Detailed specifications are given, and measuring, balancing, and testing devices are described.—*Toledo Scale Co., Toledo 1.*

Circle L235H on Reader Service Card

Materials Handling

Bin Level Indicator

Automatic control of machinery in response to fluctuating level of materials in silos, bins, hoppers, chutes, pipes, and conveyor boxes is function of indicators outlined in 18-page catalog. There are numerous explanatory graphs.—*The Bin-Dicator Co., 13946 Kercheval Ave., Detroit 15.*

Circle L235I on Reader Service Card

Hand Trucks, Stackers

Bulletin P809 of 16 pages describes models, operational features, and applications of line of motorized hand trucks and electric stackers. Capacities range to 6,000 lb. Units are termed particularly suited for areas where floor capacities preclude use of sit-down type trucks.—*The Yale & Towne Mfg. Co., 11,000 Roosevelt Blvd., Philadelphia 15.*

Circle L235J on Reader Service Card

Ice Cream Bodies

Three basic ice cream delivery body styles are spotlighted in new 6-page folder. There is a choice in styling, and construction is tailored to meet individual needs. —*Batavia Body Co., Batavia, Ill.*

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Skids and Boxes

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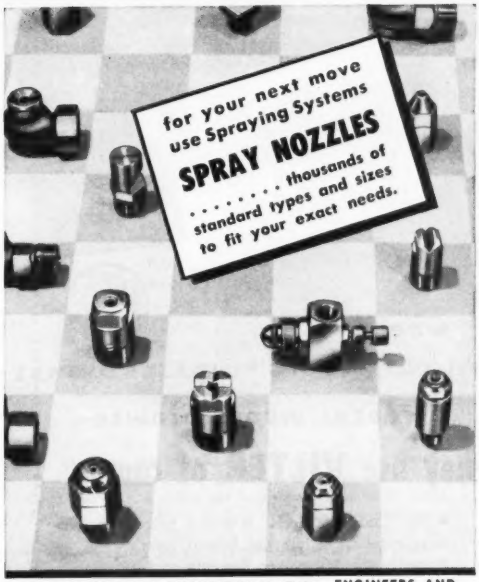

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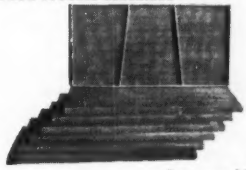

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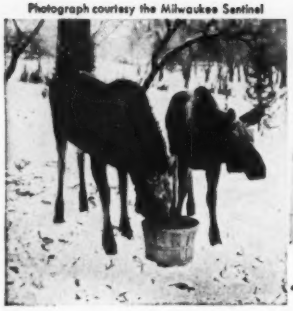

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welded skids of steel-leg type are set forth in Bulletin 4882. Free trial of units is offered. 8 pages. —*Barret-Cravens Co., 4613 S. Western Blvd., Chicago 9.*

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Weighing, Proportioning Systems

Approaches to problem of weighing, batching, and proportioning materials is core of 56-page Catalog 841. Equipment relating to each phase of processing is shown.—*The Jeffrey Mfg. Co., Columbus 16, Ohio.*

Circle L237A on Reader Service Card

Belt Lacing

Suitable for joining conveyor and transmission belting of generally used composition are two types of belt lacing described in Bulletin A-60. First type is nickel-copper alloy, recommended for use in such facilities as salt plants, canneries, and fisheries. Second is copper alloyed with silicon and manganese, thus non-magnetic and anti-sparkling. 4 pages.—*Flexible Steel Lacing Co., Chicago 44.*

Circle L237B on Reader Service Card

Palletized Containers

Complete details of construction features help explain utility of palletized containers illustrated in 4-page bulletin. Lightweight and wirebound, containers are termed versatile for many applications.—*The American Box Co., 1900 W. 3rd St., Cleveland.*

Circle L237C on Reader Service Card

Lift Trucks

Bulletin 4861 reports advantages of line of lift trucks with 4,000 and 6,000 lb. capacity. Speed is termed uniform whether truck is loaded or empty. Specifications and detailed photos of parts are given. 8 pages.—*Barrett-Cravens Co., 4613 S. Western Blvd., Chicago 9.*

Circle L237D on Reader Service Card

Plant Supplies

Roof Tile

Technical data on advantages of roof tile is presented in 11-page Bulletin 4-K-2. Insulating value, strength, fire resistance, weight, and facts concerning nail-holding power and light reflectivity are included. Pictorially outlined.—*Owens-Illinois Glass Co., Kaylo Div., Toledo.*

Circle L237E on Reader Service Card

Insulating Material

Used in ranges, refrigerators, water heaters, and other appliances, insulating material described in 4-page folder is specified having such characteristics as non-combustibility, ability to withstand odors, easy handling, and long life. —*Owens-Corning Fiberglas Corp., Toledo 1.*

Circle L237F on Reader Service Card

Tubing Installations

Comprehensive survey of factors affecting tube life in high-pressure, high-temperature applications is presented in 40-page Booklet TR 516. Described are results in investigating failures of carbon steel, intermediate chromiummolybdenum alloy steel and stainless steel tubing in boilers, cracking stills, heaters, and heat exchangers.—*The Babcock & Wilcox Co., Beaver Falls, Pa.*

Circle L237G on Reader Service Card

Miscellaneous

Measuring Equipment

Containing 150 photos and diagrams, new Catalog 1016 describes features and uses of more than 130 testing and measuring instruments. Its 80 pages also include references to special bulletins describing each device in greater detail. Prices are given. —*General Electric Co., Schnectady 5, N. Y.*

Circle L237H on Reader Service Card

Sanitary Workboards

Illustrated catalog of 8-pages is devoted to workboards. Details such as die-drawn seamless joint sinks, and sanitizing basin are shown. Workboards of various lengths and models, with underviews of plumbing arrangements, are shown. Catalog S-470.—*The Bastian-Blessing Co., 4203 Peterson Ave., Chicago 30.*

Circle L237I on Reader Service Card

Steel Service Plant

Facilities for quick supply of various steel items from stock to greater Cincinnati and Central South are reported in 12-page booklet describing plant recently completed. Photos point to stocks, cutting and shipping facilities, and other factors enhancing servicing ability of plant.—*Joseph T. Ryerson & Son, Inc., Box 300, Cincinnati 14.*

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The Strahman Spray Nozzle does a better job with the least amount of water. This precision made nozzle enables the operator to get any type stream of water to do his job by simply pressing the lever. A soft spray is sent forth with slight pressure on the lever, and a strong straight stream may be had by pushing the lever all the way down. This convenient control of the wash water assures better cleaning with a lot less effort. The nozzle automatically shuts off the moment the lever is released, thereby eliminating all waste of water. *List Price $17.50*

RENEWABLE RUBBER COVER. The sturdy cover protects the nozzle and your equipment against knocks and dents. When the cover becomes worn, replace it with a new one.

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How Can America Produce All the Steel It Needs ... for Military... and Civilian Purposes?

FREE BOOKLET Tells How to Conduct Scrap Salvage Program in *Your* Business.

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One way is to feed more pig iron into the furnaces. But . . .

That will require *more* supplies of ore, limestone, coal, etc.*—to say nothing of more new ore boats and rail cars to transport the additional supplies.

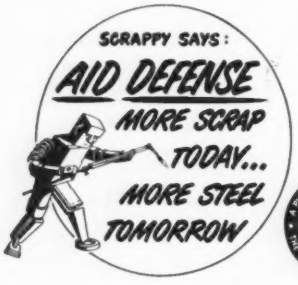
A better way—the *only* practical way—is to use the *dormant* iron and steel scrap lying around in the form of old machines, equipment, tools and metal structures.

Your business *must* have available scrap—in *some* form. That scrap is *needed* to keep the furnaces going in the steel mills . . . to keep our fighting forces and our allies well armed . . . to sustain our civilian life at home.

Think how many ways *you* use iron and steel. Think what would happen if it became extremely scarce. Put your iron and steel scrap to good use—now—by selling it to your local scrap dealer.

Don't delay—the emergency is becoming more severe every day.

*For every ton of scrap fed into the furnaces, we save approximately 2 tons of iron ore, 1 ton of coal, nearly ½ ton of limestone and many other critical materials. Also, scrap helps make steel faster, shortens the refining process.



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received by March 24th will appear in the April issue subject to limitation of space available. Address copy to the

FOOD ENGINEERING

330 W. 42nd St., New York 36, N. Y.

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QUAKER CITY COLD STORAGE CO., Inc.

PHILADELPHIA, PA.

3 WAREHOUSE LOCATIONS

Proper Temperature for Frozen Foods

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For the Food Processor

CARROT OIL

makes foods golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

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NUTRITIONAL RESEARCH ASSOCIATES
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Each announcement represents a current Want or Offering of an organization or individual in the field, with some element of profit in each for whoever can fill the need. Some have money-saving possibilities, others are opportunities for more business; many are employment opportunities; still others offer property, or equipment—used or surplus new equipment.

"Searchlight" advertisements are constantly changing. New opportunities are constantly finding their way into this great Want medium, each issue. Regular reading of the "Searchlight" pages can be as important to you as reading the editorial sections; Editorial matter is NEWS OF OPPORTUNITIES offered in the industry.

for EVERY business WANT "Think SEARCHLIGHT first"

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CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

SEARCHLIGHT SECTION

Classified Advertising

EMPLOYMENT; BUSINESS: **"OPPORTUNITIES"** :EQUIPMENT :USED OR RESALE

EMPLOYMENT SERVICE

SALARIED PERSONNEL, $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

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FOOD TECHNOLOGIST—Control, Development, Production, B.S. and M.S.—MIT. Experience covers wide range food products including bakery, mayonnaise, preserves, candy, public feeding. Married, 28. Now employed, but desire re-location in responsible job involving production and development or sales. PW-3293, Food Engineering.

FOOD TECHNOLOGIST: Experienced production supervision, product and processing research, wants position as plant superintendent or related. 15 years experience canned and frozen foods; ice cream, fountain, and bakery supplies. Technical background: food technology and industrial engineering. Age 40, married, family. PW-3405, Food Engineering.

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WORKING FOREMAN Capable. Expert commercial chef, 25 years practical and technical experience in production of a large variety quality foods, specialties and products for the Italian trade. Will relocate. PW-3352, Food Engineering.

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SALES REPRESENTATIVE with successful background covering Iowa and northern Illinois is interested in securing an additional account for sales representation. Interested in account which might become our major line or sideline which would fit in with our present mechanical equipment. RA-3376, Food Engineering.

SCIENTIST DESIRES Technical Sales position. Well rounded microbiologist with better than N.S. equivalent; with biochemical interest. Good industrial research experience. Experience in food technology. Professional member of I.F.T. Good medical microbiological background from Naval service. Registered medical technologist. SA-3344, Food Engineering.

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Wanted Services Preserving Man with some capital for active charge processing and production in small preserving plant southern state. Without advertising public demand for quality item necessitated expansion program. Have D&B rating, and unlimited future and a lot of hard work now. All replies confidential. BO-3307, Food Engineering.

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CONSULT: Z. H. POLACHEK,
Reg. Patent Attorney, 1234 Broadway, New York 1, N. Y.

WANTED

ANYTHING within reason that is wanted in the field served by Food Engineering can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

Food Manufacturers Attention

We are open to take on foods for distribution and selling in the South. Located 40 miles south of Atlanta. Have refrigerated trucks, freezing facilities, limited cold storage and warehouse facilities. State what kinds of foods whether frozen or otherwise. Write

RA-3398, Food Engineering
330 W. 42 St., New York 36, N. Y.

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Food chemist thoroughly experienced all phases production and management. Will invest capital and services in sound, established food manufacturing firm within Greater New York area that can withstand thorough investigation. Strictly confidential.

BO-3502, Food Engineering
330 W. 42 St., New York 36, N. Y.

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Openings for B.S. graduates, with Laboratory experience, with long established nationally known concern located New York City. Experience in food field preferred. Experience in products development also desirable. Salary commensurate with experience & qualifications. 5 day week. Submit detailed resume of experience, education, age, present salary, etc.

Box No. P-2988, Food Engineering
330 W. 42nd St., New York 36, N. Y.

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Packaging field experience preferred. Large well-known concern located New York City has opening for B.S. graduate with minimum of one (1) years experience in Laboratory work. Salary commensurate with experience and qualifications. 5 day week. Submit detailed resume of experience, education, age, present salary, etc.

Box No. P-2989, Food Engineering
330 W. 42nd St., New York 36, N. Y.

WANTED
TECHNICAL EXPERT

Thoroughly experienced in the manufacture of ossein and gelatin. All inquiries confidential.

P-3337, Food Engineering
330 W. 42 St., New York 36, N. Y.

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Employers Should Have Some Benefits Too!

With that in mind busy food executives find that my files are invaluable to them when they consult me for that particular expert they want.

Your requests for personnel are given careful and interested attention. Applicants are only submitted on the strength of their proved worth and investigated background.

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Qualified Employment Agency
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QUALITY CONTROL EXPERT WITH MANY YEARS OF FOOD RESEARCH AND FOOD ENGINEERING EXPERIENCE

Food production quality problems statistically analyzed with control charts. New methods and equipment developed for testing and improving food products. Electronic equipment developed for automatic control of food processing. New processing equipment developed and old equipment improved. Now employed.

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An opportunity to secure a man with creative ability to develop New Processes, New Food Products and New Machines. My patents have made large sums for our firm. Their compulsory retirement policy will affect me in a few months. I am in perfect health. Contract or job basis. Two degrees and a number of publications. References from highest executives.

PW-3436, Food Engineering
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a. Mathematics and Chemistry of Food Technology
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c. Nutrition
d. Canning
e. Freezing
f. Preserving
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RESTAURANT MANAGEMENT
GENERAL STUDY OF COOKING
PREPARATION OF SALADS
PIE AND PASTRY MAKING
CAKE DECORATING
STUDY OF MEATS

MEN OR WOMEN
VETERANS OR NON-VETERANS
DAY AND NIGHT CLASSES

Highly qualified instructors with practical experience as well as European and American degrees in their respective fields.

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Completely equipped. An established business ready to go. Ideal size for partners or family. Capacity flexible. Room for expansion. Good supply of experienced labor. fine fruits, vegetables, berries, salmon. For immediate sale at a price that provides a secure investment.

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Small but Complete Used Plant for the Manufacture of Preserves and Jelly.

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Rebuilt For New Machine Accuracy

At A Fraction Of The Original Cost

UNION Rebuilt Machinery

Established 1912

International Stainless Steel Straightline Vacuum Filler, with Automatic Feeder, 160 per minute.
Resina S and LC Automatic Cappers.
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Day and Robinson 100, 2400, 4000 lbs. Dry Powder Mixers and Sifters.
J. H. Day 35 and 75 gal. Imperial Double Arm Steam Jacketed Mixers.
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S. & S. G1 and G2 Auger Fillers.
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Whiz Packer Fillers.
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Filler 4 head S. S. Auto. Piston Filler.
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Amsco and Doughboy Auto. Cellophane Bag Sealers.
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Battery of Grimolas and Macaroni Dough Mixers.
Clermont Auto. Noodle Cutter.
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TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT

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4—Readco Steam Jacketed Mixers, 600 lb. Capacity—Ribbon Arm
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One (1) No. 429 Standard Knapp Conveyor Top and Bottom Shipping Case Gluer—Together with one (1) No. 606-61 Compression Unit—Complete—Ready To Use—Practically New.

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Food Processing Equipment including Aluminum and S/S Kettles, Mixers, Vacuum Pans, Dehydration equipment, Grinders, Elevators, Stills, Colloid Mills, Conveyors, Filters, Packaging Units, Wrapping Machines. Will consider a set up plant now operating or shut down. When offering give full particulars.

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FROM 50 TO 5000 GALS.

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2 Transwrap Machines, Model A & B
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Dryer: 36"x80" double roll atmospheric.
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BUY BEST in the WEST

M&S 6 Piston #10 Filler, bronze
M&S 10 Piston S.S. Fillers. (6)
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Std Knapp Box-46oz Quick Adj Labeler
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Sprague #10 Cooker-Cooler. 580-290 can.
Bird 36" x 50" Cont. Centrif.
Std Knapp Model FE 46oz Caser.
Burt #10 Caser, with elevator
FMC High Pressure Tomato Line 42" x 56'
Majonnier 24 Pocket S.S. Filler.
Groen 300 gal S.S. Kettles. 100# wp. (4)
Atlas Pacific 6 tph Lye Peeler
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A-B Double Deck 2½ Exhaust Boxes (2)
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Packo Top Sealer with 18' Comp. Unit.
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MACHINERY AND EQUIPMENT CO.
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2 WHIZ FILLERS
1 FILLER MACHINE

SEMI-AUTO PISTON FILLER
CAPACITY OF EACH UNIT—16 OZ.
Pennsylvania Frosted Foods Corp.
Southampton, Penna.

FOR SALE FROM STOCK

8—3000 gal. Horiz. Demountable Stainless Steel Truck Tanks, insulated & agitated, sanitary fittings, excellent for transporting, storing or holding milk, food products, wines, etc.

1—2000 gal. Horiz. Stainless Steel Truck Tank, insulated.

1—Illinois Water Treating System, 500 GPH flow-rate, complete with Zeolite tank.

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70—Stainless Steel and Stainless Clad Jacketed Kettles. 10, 40, 60, 80, 100, 150, 500 gal.

35—Stainless Steel Tanks, 30, 50, 60, 100, 150, 300, 400, 500, 900, 1000, 1400, 3000, 3500 and 5700 gal.

1—100-gal. T347 Stainless Steel Pressure Tank, 250# Pr., Elec. heated.

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6—Powder Mixers, 50#, 100#, 200#, 400#, 2000#, 2400#.

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10—Rotary Pellet Presses, Stokes B-2, D-3 & D-4; Kux model 25.

2—Triangles G-2-C Elec-Tri-Pak Weighers & Fillers.

2—Elgin Auto Twin Piston Fillers.

1—International 12 spout automatic Vacuum Filler, Stainless.

2—Mojonnier #90 Rotary Vacuum Fillers. 14-spout; stainless.

1—Feinc Rotary Vacuum Filter, string discharge, 4'6" dia. x 6', aluminum.

2—Sweetland Filters, #2 & #5.

10—Distillation Columns, aluminum, copper, steel.

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ONE-PIECE WELDED BREWERY TANKS

22—15,190 gal. Horiz. Lastiglas lined
3— 5,859 gal. Horiz. Lastiglas lined
2— 5,270 gal. Horiz. Lastiglas lined
24— 3,100 gal. Vertical, closed, mammut lined.

Excellent Condition

PERRY EQUIPMENT CORP.
1411 N. 6th ST. PHILA. 22, PA.

FOR SALE

3—32"x90" Buflovak Double Drum Dryers.
3000 gal. S.S. Truck Tanks, Trailerized.
100 gal. S.S. Clad jkt. Kettles, 30"x52".
150 gal. S.S. jkt. Kettle, 42"x34", agit.
100 to 250 gal. S.S. Mix Tanks, water jkt.
300 to 4000 gal. Glass Lined Tanks.
7 H.P. McKee Gas Fired Boiler.
15 H.P. Lookout Boiler, Coal Fired.
26" Centrifugal Extractors, 3 H.P.
Colloid Mills, 7½ and 15 H.P.
Gruendler Junior Pulverizer, 10 H.P.
75 to 1500 gal. Homogenizers or Viscolizers.
Model 148C Stokes High Vacuum Pump, 1½ H.P.
Hobart Grinder, 1½ H.P.
3 ft. to 6 ft. Copper Vacuum Pans.
2" Cherry-Burrell S.S. Pump, 5 H.P.
Milk Pasteurizers, Coolers, Fillers, Washers.

Send us your inquiries

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Murray Hill 2-4616

CHOICE CANNING EQUIPMENT AVAILABLE AT LOW PRICES

6 Food Mach. M. & S. 10 Pocket Stainless Steel Fillers complete
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6 Sterling 50 lb. Peelers
2 Sterling Model EM-1D Dicers
2 Boutell S.S. Apple Slicers
1 Biro Stainless Meat Saw
1 Chisholm Ryder Relish Cutter
3 Standard Knapp Wrap Around Labellers
6 Anderson Barnsgover Can Washers
Standard Knapp Casers and Case Printers
Hartford Empire Unscrambler for Cans or Glass

FIRST MACHINERY CORP.
157 Hudson Street,
New York 13, N. Y.

FOR SALE

6—Pocket M & S #1 filler—will handle cans or jars up to 309—now set up for 211-304 or 8Z tall—new change parts for 202-309—bronze contact parts—can chute

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2—Downington Stainless Steel Heat Exchangers, 500 sq. ft. ea.
1—Day Jumbo Jacketed Powder Mixer, 6,000 lbs.
1—Readco Stainless Steel Jacketed Double Arm Mixer, 250 gals. cap., with Sigma Blades.
1—Stainless Steel Mixing Tank, 1000 gals. cap. with 10 HP Nettco drive.
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1—Link Belt Roto-Louvre Dryer 2'7"x8', monel.
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1—Fletcher 40" Suspended Centrifugal, stainless perforated basket, bottom discharge, m.d.
1—Tolhurst 48" center slung stainless steel Centrifugal.
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2—Stokes "B-2" Rotary Tablet Machines
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3—Steel 9500 gal. closed jack. agit. Kettles.
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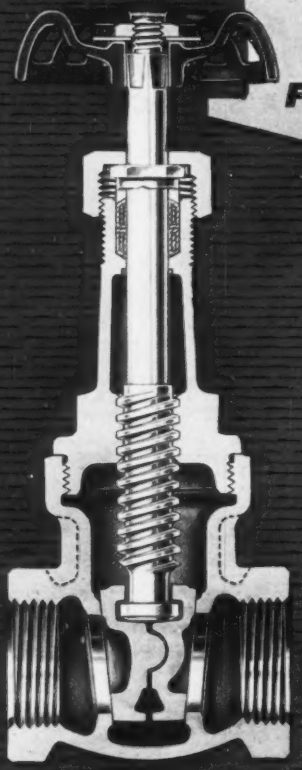

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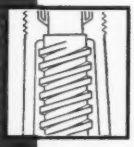

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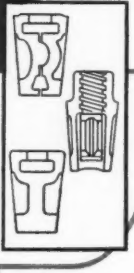

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WHAT THE NUMBERS MEAN

The number after each item in the list is the number of the page it appears on. Where more than one item is described on a page, prefix capital letters indicate position: L,R,T,B,C (left, right, top, bottom, center). Small letters are used to separate several products described in an advertisement. Capital letters following page numbers identify products and literature described in monthly editorial departments.

The same numbers appear on the postcard in numerical order.

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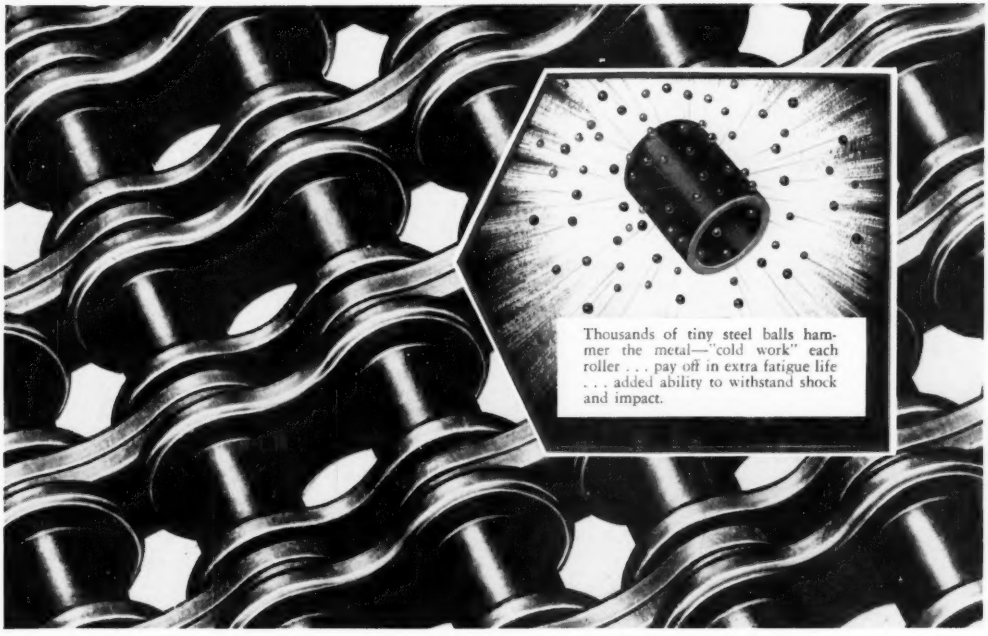
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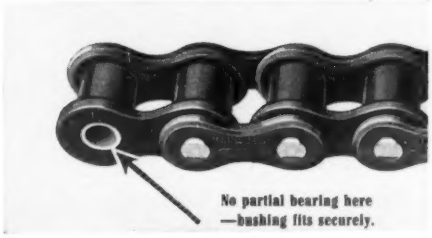

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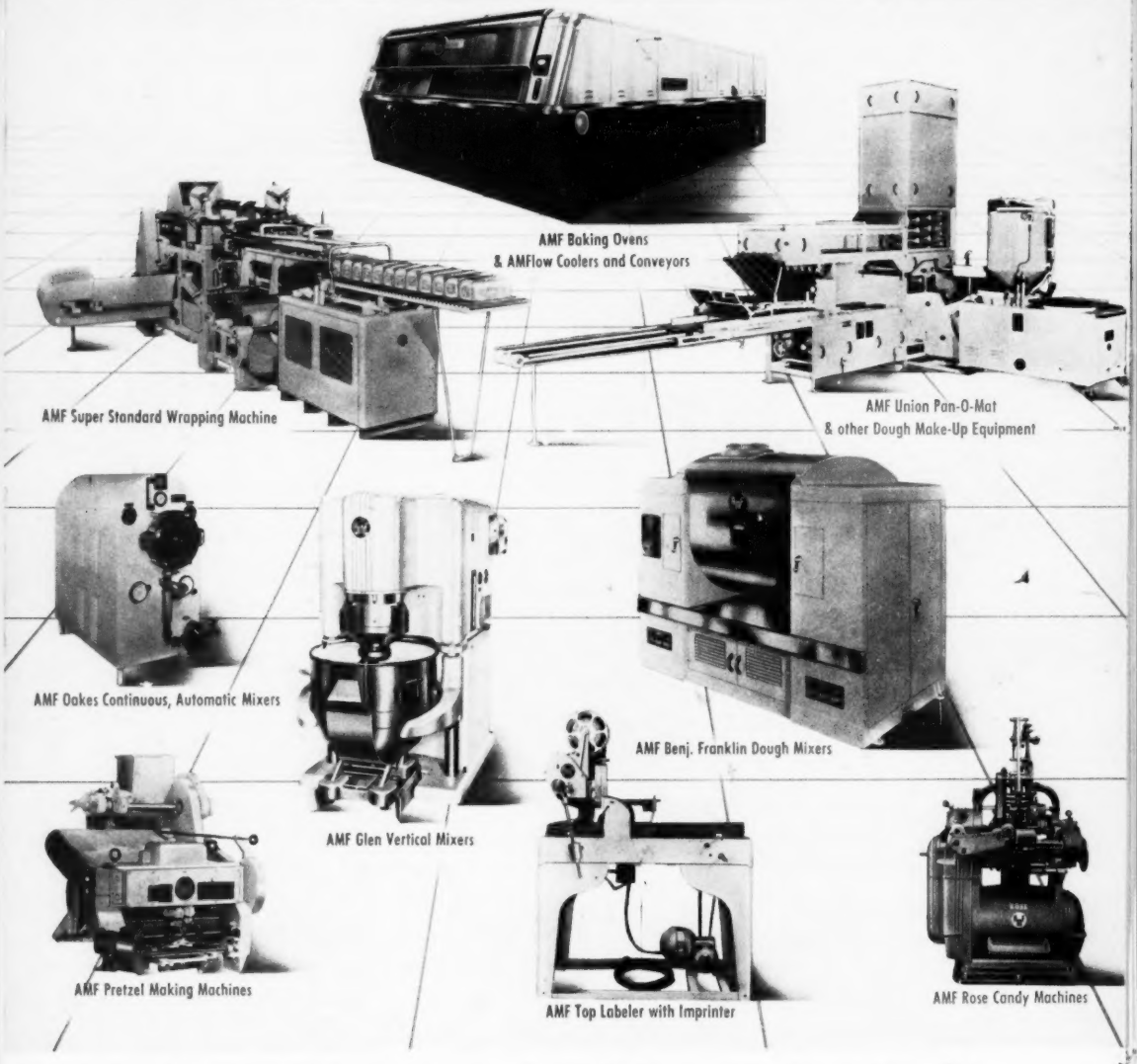
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